SYMBOLS AND TERMINOLOGY FOR PHYSICAL AND CHEMICAL QUANTITIES

The International Organization for Standardization (ISO), International Union of Pure and Applied Chemistry (IUPAC), and the International Union of Pure and Applied Physics (IUPAP) have jointly developed a set of recommended symbols for physical and chemical quantities. Consistent use of these recommended symbols helps assure unambiguous scientific communication. The list below is reprinted from Reference 1 with permission from IUPAC. Full details may be found in the following references:

1. Ian Mills, Ed., *Quantities, Units, and Symbols in Physical Chemistry,* Blackwell Scientific Publications, Oxford, 1988.
2. E. R. Cohen and P. Giacomo, *Symbols, Units, Nomenclature, and Fundamental Constants in Physics*, Document IUPAP–25, 1987; also published in *Physica*, 146A 1–68, 1987.
3. *ISO Standards Handbook 2: Units of Measurement*, International Organization of Standardization, Geneva, 1982.

GENERAL RULES

The value of a physical quantity is expressed as the product of a numerical value and a unit, e.g.:

$T = 300$ K
$V = 26.2$ cm^3
$C_p = 45.3$ J mol^{-1} K^{-1}

The symbol for a physical quantity is always given in italic (sloping) type, while symbols for units are given in roman type. Column headings in tables and axis labels on graphs may conveniently be written as the physical quantity symbol divided by the unit symbol, e.g.:

T/K
V/cm^3
C_p/J mol^{-1} K^{-1}

The values in the table or graph axis are then pure numbers. Subscripts to symbols for physical quantities should be italic if the subscript refers to another physical quantity or to a number, e.g.:

C_p – heat capacity at constant pressure
B_n – nth virial coefficient

Subscripts which have other meanings should be in roman type:

m_p – mass of the proton
E_k – kinetic energy

The following tables give the recommended symbols for the major classes of physical and chemical quantities. The expression in the Definition column is given as an aid in identifying the quantity but is not necessarily the complete or unique definition. The SI Unit gives one (not necessarily unique) expression for the coherent SI unit for the quantity. Other equivalent unit expressions, including those which involve SI prefixes, may be used.

Name	Symbol	Definition	SI unit
Space and Time			
cartesian space coordinates	x, y, z		m
spherical polar coordinates	r, θ, ϕ		m, 1, 1
generalized coordinate	q, q_i		(varies)
position vector	r	$r = x\boldsymbol{i} + y\boldsymbol{j} + z\boldsymbol{k}$	m
length	l		m
special symbols:			
height	h		
breadth	b		
thickness	d, δ		
distance	d		
radius	r		
diameter	d		
path length	s		
length of arc	s		
area	A, A_s, S		m^2
volume	$V, (v)$		m^3
plane angle	$\alpha, \beta, \gamma, \theta, \phi \ldots$	$\alpha = s/r$	rad, 1
solid angle	ω, Ω	$\omega = A/r^2$	sr, 1
time	t		s
period	T	$T = t/N$	s
frequency	ν, f	$\nu = 1/T$	Hz
circular frequency, angular frequency	ω	$\omega = 2\pi\nu$	rad s^{-1}, s^{-1}
characteristic time interval, relaxation time, time constant	τ, T	$\tau = \lvert \mathrm{d}t/\mathrm{d}\ln x \rvert$	s
angular velocity	ω	$\omega = \mathrm{d}\phi/\mathrm{d}t$	rad s^{-1}, s^{-1}
velocity	$\boldsymbol{v}, \boldsymbol{u}, \boldsymbol{w}, \boldsymbol{c}, \dot{\boldsymbol{r}}$	$v = \mathrm{d}\boldsymbol{r}/\mathrm{d}t$	m s^{-1}

Name	Symbol	Definition	SI unit
speed	v, u, w, c	$v = \lvert \boldsymbol{v} \rvert$	m s^{-1}
acceleration	$\boldsymbol{a}$, (g)	$\boldsymbol{a} = \mathrm{d}\boldsymbol{v}/\mathrm{d}t$	m s^{-2}
Classical Mechanics			
mass	m		kg
reduced mass	μ	$\mu = m_1 m_2/(m_1 + m_2)$	kg
density, mass density	ρ	$\rho = m/V$	kg m^{-3}
relative density	d	$d = \rho/\rho$	1
surface density	ρ_A, ρ_S	$\rho_A = m/A$	kg m^{-2}
specific volume	v	$v = V/m = 1/\rho$	m^3 kg^{-1}
momentum	$\boldsymbol{p}$	$\boldsymbol{p} = m\boldsymbol{v}$	kg m s^{-1}
angular momentum, action	$\boldsymbol{L}$	$\boldsymbol{L} = \boldsymbol{r} \times \boldsymbol{p}$	J s
moment of inertia	I, J	$I = \Sigma m_i r_i^2$	kg m^2
force	$\boldsymbol{F}$	$\boldsymbol{F} = \mathrm{d}\boldsymbol{p}/\mathrm{d}t = m\boldsymbol{a}$	N
torque, moment of a force	$\boldsymbol{T}$, $(\boldsymbol{M})$	$\boldsymbol{T} = \boldsymbol{r} \times \boldsymbol{F}$	N m
energy	E		J
potential energy	E_p, V, Φ	$E_p = \int \boldsymbol{F} \cdot ds$	J
kinetic energy	E_k, T, K	$E_k = 1/2mv^2$	J
work	W, w	$W = \int \boldsymbol{F} \cdot ds$	J
Hamilton function	H	$H(q, p) = T(q, p) + V(q)$	J
Lagrange function	L	$L(q, \dot{q}) = T(q, \dot{q}) - V(q)$	J
pressure	p, P	$p = F/A$	Pa, N m^{-2}
surface tension	γ, σ	$\gamma = \mathrm{d}W/\mathrm{d}A$	N m^{-1}, J m^{-2}
weight	G, (W, P)	$G = mg$	N
gravitational constant	G	$F = Gm_1 m_2/r^2$	N m^2 kg^{-2}
normal stress	σ	$\sigma = F/A$	Pa
shear stress	τ	$\tau = F/A$	Pa
linear strain, relative elongation	ε, e	$\varepsilon = \Delta l/l$	1
modulus of elasticity, Young's modulus	E	$E = \sigma/\varepsilon$	Pa
shear strain	γ	$\gamma = \Delta x/d$	1
shear modulus	G	$G = \tau/\gamma$	Pa
volume strain, bulk strain	θ	$\theta = \Delta V/V_0$	1
bulk modulus, compression modulus	K	$K = -V_0(\mathrm{d}p/\mathrm{d}V)$	Pa
viscosity, dynamic viscosity	η, μ	$\tau_{x,z} = \eta(\mathrm{d}v_x/\mathrm{d}z)$	Pa s
fluidity	ϕ	$\phi = 1/\eta$	m kg^{-1} s
kinematic viscosity	ν	$\nu = \eta/\rho$	m^2 s^{-1}
friction coefficient	μ, (f)	$F_{\mathrm{frict}} = \mu F_{\mathrm{norm}}$	1
power	P	$P = \mathrm{d}W/\mathrm{d}t$	W
sound energy flux	P, P_a	$P = \mathrm{d}E/\mathrm{d}t$	W
acoustic factors			
reflection factor	ρ	$\rho = P_r/P_0$	1
acoustic absorption factor	α_a, (α)	$\alpha_a = 1 - \rho$	1
transmission factor	τ	$\tau = P_{tr}/P_0$	1
dissipation factor	δ	$\delta = \alpha_a - \tau$	1
Electricity and Magnetism			
quantity of electricity, electric charge	Q		C
charge density	ρ	$\rho = Q/V$	C m^{-3}
surface charge density	σ	$\sigma = Q/A$	C m^{-2}
electric potential	V, ϕ	$V = \mathrm{d}W/\mathrm{d}Q$	V, J C^{-1}
electric potential difference	$U, \Delta V, \Delta\phi$	$U = V_2 - V_1$	V
electromotive force	E	$E = \int(\boldsymbol{F}/Q) \cdot ds$	V
electric field strength	$\boldsymbol{E}$	$\boldsymbol{E} = \boldsymbol{F}/Q = -\operatorname{grad} V$	V m^{-1}
electric flux	Ψ	$\Psi = \int \boldsymbol{D} \cdot \mathrm{d}\boldsymbol{A}$	C
electric displacement	$\boldsymbol{D}$	$\boldsymbol{D} = \varepsilon\boldsymbol{E}$	C m^{-2}
capacitance	C	$C = Q/U$	F, C V^{-1}
permittivity	ε	$\boldsymbol{D} = \varepsilon\boldsymbol{E}$	F m^{-1}
permittivity of vacuum	ε_0	$\varepsilon_0 = \mu_0^{-1} c_0^{-2}$	F m^{-1}
relative permittivity	ε_r	$\varepsilon_r = \varepsilon/\varepsilon_0$	1
dielectric polarization (dipole moment per volume)	$\boldsymbol{P}$	$\boldsymbol{P} = \boldsymbol{D} - \varepsilon_0\boldsymbol{E}$	C m^{-2}
electric susceptibility	χ_e	$\chi_e = \varepsilon r - 1$	1
electric dipole moment	$\boldsymbol{p}, \boldsymbol{\mu}$	$\boldsymbol{p} = Q\boldsymbol{r}$	C m

Name	Symbol	Definition	SI unit
electric current	I	$I = \mathrm{d}Q/\mathrm{d}t$	A
electric current density	$\boldsymbol{j}, \boldsymbol{J}$	$I = \int \boldsymbol{j} \cdot \mathrm{d}\boldsymbol{A}$	A m^{-2}
magnetic flux density, magnetic induction	$\boldsymbol{B}$	$\boldsymbol{F} = Q\boldsymbol{v} \times \boldsymbol{B}$	T
magnetic flux	Φ	$\Phi = \int \boldsymbol{B} \cdot \mathrm{d}\boldsymbol{A}$	A m^{-2}
magnetic field strength	$\boldsymbol{H}$	$\boldsymbol{B} = \mu \boldsymbol{H}$	A m^{-2}
permeability	μ	$\boldsymbol{B} = \mu \boldsymbol{H}$	N A^{-2}, H m^{-1}
permeability of vacuum	μ_0		H m^{-1}
relative permeability	μ_r	$\mu_r = \mu/\mu_0$	1
magnetization (magnetic dipole moment per volume)	$\boldsymbol{M}$	$\boldsymbol{M} = \boldsymbol{B}/\mu_0 - H$	A m^{-1}
magnetic susceptibility	χ, κ, (χ_m)	$\chi = \mu_r - 1$	1
molar magnetic susceptibility	χ_m	$\chi_m = V_m \chi$	m^3 mol^{-1}
magnetic dipole moment	$\boldsymbol{m}, \boldsymbol{\mu}$	$E_p = -\boldsymbol{m} \cdot \boldsymbol{B}$	A m^2, J T^{-1}
electrical resistance	R	$R = U/I$	Ω
conductance	G	$G = 1/R$	S
loss angle	δ	$\delta = (\pi/2) + \phi_I - \phi_U$	1, rad
reactance	X	$X = (U/I)\sin\delta$	Ω
impedance (complex impedance)	Z	$Z = R + iX$	Ω
admittance (complex admittance)	Y	$Y = 1/Z$	S
susceptance	B	$Y = G + \mathrm{i}B$	S
resistivity	ρ	$\rho = E/j$	Ω m
conductivity	κ, γ, σ	$\kappa = 1/\rho$	S m^{-1}
self–inductance	L	$E = -L(\mathrm{d}I/\mathrm{d}t)$	H
mutual inductance	M, L_{12}	$E_1 = L_{12}(\mathrm{d}I_2/\mathrm{d}t)$	H
magnetic vector potential	$\boldsymbol{A}$	$\boldsymbol{B} = \nabla \times \boldsymbol{A}$	Wb m^{-1}
Poynting vector	$\boldsymbol{S}$	$\boldsymbol{S} = \boldsymbol{E} \times \boldsymbol{H}$	W m^{-2}
Quantum Mechanics			
momentum operator	$\hat{\boldsymbol{p}}$	$\hat{\boldsymbol{p}} = -\mathrm{i}h\nabla$	m^{-1} J s
kinetic energy operator	$\hat{T}$	$\hat{T} = -(h^2/2m)\nabla^2$	J
Hamiltonian operator	$\hat{H}$	$\hat{H} = \hat{T} + V$	J
wavefunction, state function	Ψ, ψ, ϕ	$\hat{H}\psi = E\psi$	(m$^{-3/2}$)
probability density	P	$P = \psi^*\psi$	(m^{-3})
charge density of electrons	ρ	$\rho = -eP$	(C m^{-3})
probability current density	$\boldsymbol{S}$	$\boldsymbol{S} = -i\hbar(\psi^*\nabla\psi - \psi\nabla\psi^*)/2m_e$	(m^{-2} s^{-1})
electric current density of electrons	$\boldsymbol{j}$	$\boldsymbol{j} = -e\boldsymbol{S}$	(A m^{-2})
matrix element of operator Â	A_{ij}, $\langle i\|\hat{A}\|j\rangle$	$A_{ij} = \int \psi_i^* \hat{A} \psi_j \mathrm{d}\tau$	(varies)
expectation value of operator Â	$\langle A\rangle$, $\bar{A}$	$\langle A\rangle = \int \psi^* \hat{A} \Psi \mathrm{d}\tau$	(varies)
hermitian conjugate of Â	$\hat{A}^\dagger$	$(\hat{A}^\dagger)_{ij} = (A_{ji})^*$	(varies)
commutator of Â and $\hat{B}$	$[\hat{A}, \hat{B}]$, $[\hat{A}, \hat{B}]_-$	$[\hat{A}\,\hat{B}] = \hat{A}\hat{B} - \hat{B}\hat{A}$	(varies)
anticommutator	$[\hat{A}, \hat{B}]_+$	$[\hat{A}, \hat{B}]_+ = \hat{A}\hat{B} + \hat{B}\hat{A}$	(varies)
spin wavefunction	α; β		1
coulomb integral	H_{AA}	$H_{AA} = \int \psi_A^* \hat{H} \psi_A \mathrm{d}\tau$	J
resonance integral	H_{AB}	$H_{AB} = \int \psi_A^* \hat{H} \psi_B \mathrm{d}\tau$	J
overlap integral	S_{AB}	$S_{AB} = \int \psi_A^* \psi_B \mathrm{d}\tau$	1
Atoms and Molecules			
nucleon number, mass number	A		1
proton number, atomic number	Z		1
neutron number	N	$N = A - Z$	1
electron rest mass	m_e		kg
mass of atom, atomic mass	m_a, m		kg
atomic mass constant	m_u	$m_u = m_a(^{12}C)/12$	kg
mass excess	Δ	$\Delta = m_a - Am_u$	kg
elementary charge, proton charge	e		C
Planck constant	h		J s
Planck constant/2π	$\hbar$	$\hbar = h/2\pi$	J s
Bohr radius	a_0	$a_0 = 4\pi\varepsilon_0\hbar^2/m_e e^2$	m
Hartree energy	E_h	$E_h = \hbar^2/m_e a_0^2$	J
Rydberg constant	R_∞	$R_\infty = E_h/2hc$	m^{-1}
fine structure constant	α	$\alpha = e^2/4\pi\varepsilon_0\hbar c$	1

Name	Symbol	Definition	SI unit
ionization energy	E_i		J
electron affinity	E_{ea}		J
dissociation energy	E_d, D		J
from the ground state	D_0		J
from the potential minimum	D_e		J
principal quantum number (H atom)	n	$E = -hcR/n^2$	1
angular momentum quantum numbers	see under Spectroscopy		
magnetic dipole moment of a molecule	$\boldsymbol{m}$,$\boldsymbol{\mu}$	$E_p = -\boldsymbol{m}\cdot\boldsymbol{B}$	J T^{-1}
magnetizability of a molecule	ξ	$\boldsymbol{m} = \xi B$	J T^{-2}
Bohr magneton	μ_B	$\mu_B = e\hbar/2m_e$	J T^{-1}
nuclear magneton	μ_N	$\mu_N = (m_e/m_p)\mu_B$	J T^{-1}
magnetogyric ratio (gyromagnetic ratio)	γ	$\gamma = \mu/L$	C kg^{-1}
g factor	g		1
Larmor circular frequency	ω_L	$\omega_L = (e/2m)B$	s^{-1}
Larmor frequency	ν_L	$\nu_L = \omega_L/2\pi$	Hz
longitudinal relaxation time	T_1		s
transverse relaxation time	T_2		s
electric dipole moment of a molecule	$\boldsymbol{p}$, $\boldsymbol{\mu}$	$E_p = -\boldsymbol{p}\cdot\boldsymbol{E}$	C m
quadrupole moment of a molecule	$\boldsymbol{Q}$; $\boldsymbol{\Theta}$	$E_p = 1/2\boldsymbol{Q}\colon\boldsymbol{V}'' = 1/3\boldsymbol{\Theta}\colon\boldsymbol{V}''$	C m^2
quadrupole moment of a nucleus	eQ	$eQ = 2\cdot\langle\Theta_{ZZ}\rangle$	C m^2
electric field gradient tensor	$\boldsymbol{q}$	$q_{\alpha\beta} = -\partial^2 V/\partial\alpha\partial\beta$	V m^{-2}
quadrupole interaction energy tensor	$\boldsymbol{\chi}$	$\chi_{\alpha\beta} = eQq_{\alpha\beta}$	J
electric polarizability of a molecule	α	p (induced) $= \alpha E$	C m^2 V^{-1}
activity (of a radioactive substance)	$\boldsymbol{A}$	$A = -\mathrm{d}N_B/\mathrm{d}t$	Bq
decay (rate) constant, disintegration (rate) constant	λ	$A = \gamma N_B$	s^{-1}
half life	$t_{1/2}$, $T_{1/2}$		s
mean life	τ		s
level width	Γ	$\Gamma = \hbar/\tau$	J
disintegration energy	Q		J
cross section (of a nuclear reaction)	σ		m^2
Spectroscopy			
total term	T	$T = E_{tot}/hc$	m^{-1}
transition wavenumber	$\tilde{\nu}$, (ν)	$\tilde{\nu} = T' - T''$	m^{-1}
transition frequency	ν	$\nu = (E' - E'')/h$	Hz
electronic term	T_e	$T_e = E_e/hc$	m^{-1}
vibrational term	G	$G = E_{vib}/hc$	m^{-1}
rotational term	F	$F = E_{rot}/hc$	m^{-1}
spin orbit coupling constant	A	$T_{s.o.} = A\langle\hat{\boldsymbol{L}}\cdot\hat{\mathbf{S}}\rangle$	m^{-1}
principal moments of inertia	I_A; I_B; I_C	$I_A \le I_B \le I_C$	kg m^2
rotational constants,			
in wavenumber	$\tilde{A}$; $\tilde{B}$; $\tilde{C}$	$\tilde{A} = h/8\pi^2 cI_A$	m^{-1}
in frequency	A; B; C	$A = h/8\pi^2 I_A$	Hz
inertial defect	Δ	$\Delta = I_C - I_A - I_B$	kg m^2
asymmetry parameter	κ	$\kappa = \dfrac{(2B - A - C)}{(A - C)}$	1
centrifugal distortion constants,			
S reduction	D_J; D_{JK}; D_K; d_1; d_2		m^{-1}
A reduction	Δ_J; Δ_{JK}; Δ_K; δ_J; δ_K		m^{-1}
harmonic vibration wavenumber	ω_e; ω_r		m^{-1}
vibrational anharmonicity constant	$\omega_e x_e$; x_{rs}; $g_{tt'}$		m^{-1}
vibrational quantum numbers	v_r; l_t		1
Coriolis zeta constant	ζ_{rs}^{α}		1
angular momentum quantum numbers	see additional information below		
degeneracy, statistical weight	g, d, β		1
electric dipole moment of a molecule	$\boldsymbol{p}$, $\boldsymbol{\mu}$	$E_p = -\boldsymbol{p}\cdot\boldsymbol{E}$	C m
transition dipole moment of a molecule	$\boldsymbol{M}$, $\boldsymbol{R}$	$\boldsymbol{M} = \int\psi'\boldsymbol{p}\psi''\mathrm{d}\tau$	C m
molecular geometry, interatomic distances,			
equilibrium distance	r_e		m
zero–point average distance	r_z		m

Name	Symbol	Definition	SI unit
ground state distance	r_0		m
substitution structure distance	r_s		m
vibrational coordinates,			
internal coordinates	R_i, r_i, θ_j, *etc.*		(varies)
symmetry coordinates	S_i		(varies)
normal coordinates			
mass adjusted	Q_r		$kg^{1/2}$ m
dimensionless	q_r		1
vibrational force constants,			
diatomic	f, (k)	$f = \partial^2 V/\partial r^2$	J m^{-2}
polyatomic,			
internal coordinates	f_{ij}	$f_{ij} = \partial^2 V/\partial r_i \partial r_j$	(varies)
symmetry coordinates	F_{ij}	$F_{ij} = \partial^2 V/\partial S_i \partial S_j$	(varies)
dimensionless normal coordinates	$\varphi_{rst...}$, $k_{rst...}$		m^{-1}
nuclear magnetic resonance (NMR),			
magnetogyric ratio	γ	$\gamma = \mu/I\hbar$	C kg^{-1}
shielding constant	σ_A	$B_A = (1 - \sigma_A)B$	1
chemical shift, δ scale	δ	$\delta = 10^6(\nu - \nu_0)/\nu_0$	1
(indirect) spin–spin coupling constant	J_{AB}	$\hat{H}/h = J_{AB}\hat{I}_A \cdot \hat{I}_B$	Hz
direct (dipolar) coupling constant	D_{AB}		Hz
longitudinal relaxation time	T_1		s
transverse relaxation time	T_2		s
electron spin resonance, electron paramagnetic resonance (ESR, EPR),			
magnetogyric ratio	γ	$\gamma = \mu/s\hbar$	C kg^{-1}
g factor	g	$h\nu = g\mu_B B$	1
hyperfine coupling constant,			
in liquids	a, A	$\hat{H}_{hfs}/h = a\hat{S} \cdot \hat{I}$	Hz
in solids	T	$\hat{H}_{hfs}/h = \hat{S} \cdot T \cdot \hat{I}$	Hz

Angular momentum	Operator symbol	Quantum number symbol: Total	*Z*–axis	*z*-axis
electron orbital	$\hat{\boldsymbol{L}}$	L	M_L	Λ
one electron only	$\hat{l}$	l	m_l	λ
electron spin	$\hat{S}$	S	M_S	Σ
one electron only	$\hat{s}$	s	m_s	σ
electron orbital + spin	$\hat{\boldsymbol{L}} + \hat{S}$			Ω=Λ+Σ
nuclear orbital (rotational)	$\hat{R}$	R		K_R, k_R
nuclear spin	$\hat{I}$	I	M_I	
internal vibrational				
spherical top	$\hat{l}$	$l(l\zeta)$		K_l
other	$\hat{\jmath}$, $\hat{\pi}$			$l(l\zeta)$
sum of $R + L(+ j)$	$\hat{N}$	N		K, k
sum of $N + S$	$\hat{J}$	J	M_J	K, k
sum of $J + I$	$\hat{F}$	F	M_F	

Electromagnetic Radiation

Name	Symbol	Definition	SI unit
wavelength	λ		m
speed of light			
in vacuum	c_0		m s^{-1}
in a medium	c	$c = c_0/n$	m s^{-1}
wavenumber in vacuum	$\tilde{\nu}$	$\tilde{\nu} = \nu/c_0 = 1/n\lambda$	m^{-1}
wavenumber (in a medium)	σ	$\sigma = 1/\lambda$	m^{-1}
frequency	ν	$\nu = c/\lambda$	Hz
circular frequency, pulsatance	ω	$\omega = 2\pi\nu$	s^{-1}, rad s^{-1}
refractive index	n	$n = c_0/c$	1
Planck constant	h		J s

Name	Symbol	Definition	SI unit
Planck constant/2π	$\hbar$	$\hbar = h/2\pi$	J s
radiant energy	Q, W		J
radiant energy density	ρ, w	$\rho = Q/V$	J m^{-3}
spectral radiant energy density			
in terms of frequency	ρ_ν, w_ν	$\rho = \mathrm{d}\rho/\mathrm{d}\nu$	J m^{-3} Hz^{-1}
in terms of wavenumber	$\rho_{\tilde\nu}$, $w_{\tilde\nu}$	$\rho_{\tilde\nu} = \mathrm{d}\rho / \mathrm{d}\tilde\nu$	J m^{-2}
in terms of wavelength	ρ_λ, w_λ	$\rho_\lambda = \mathrm{d}\rho/\mathrm{d}\lambda$	J m^{-4}
Einstein transition probabilities			
spontaneous emission	A_{nm}	$\mathrm{d}N_n/\mathrm{d}t = -A_{nm}N_n$	s^{-1}
stimulated emission	B_{nm}	$\mathrm{d}N_n/\mathrm{d}t = -\rho_{\tilde\nu}(\tilde\nu_{\mathrm{nm}}) \times B_{nm}N_n$	s kg^{-1}
stimulated absorption	B_{mn}	$\mathrm{d}N_n/\mathrm{d}t = -\rho_{\tilde\nu}(\tilde\nu_{\mathrm{nm}})\, B_{mn}N_m$	s kg^{-1}
radiant power, radiant energy per time	Φ, P	$\Phi = \mathrm{d}Q/\mathrm{d}t$	W
radiant intensity	I	$I = \mathrm{d}\Phi/\mathrm{d}\Omega$	W sr^{-1}
radiant exitance (emitted radiant flux)	M	$M = \mathrm{d}\Phi/\mathrm{d}A_{\mathrm{source}}$	W m^{-2}
irradiance, (radiant flux received)	E, (I)	$E = \mathrm{d}\Phi/\mathrm{d}A$	W m^{-2}
emittance	ε	$\varepsilon = M/M_{\mathrm{bb}}$	1
Stefan–Boltzmann constant	σ	$M_{\mathrm{bb}} = \sigma T^4$	W m^{-2} K^{-4}
first radiation constant	c_1	$c_1 = 2\pi h c_0^2$	W m^2
second radiation constant	c_2	$c_2 = hc_0/k$	K m
transmittance, transmission factor	τ, T	$\tau = \Phi_{\mathrm{tr}}/\Phi_0$	1
absorptance, absorption factor	α	$\alpha = \Phi_{\mathrm{abs}}/\Phi_0$	1
reflectance, reflection factor	ρ	$\rho = \Phi_{\mathrm{refl}}/\Phi_0$	1
(decadic) absorbance	A	$A = -\lg(1 - \alpha_i)$	1
napierian absorbance	B	$B = -\ln(1 - \alpha_i)$	1
absorption coefficient			
(linear) decadic	a, K	$a = A/l$	m^{-1}
(linear) napierian	α	$\alpha = B/l$	m^{-1}
molar (decadic)	ε	$\varepsilon = a/c = A/cl$	m^2 mol^{-1}
molar napierian	κ	$\kappa = \alpha/c = B/cl$	m^2 mol^{-1}
absorption index	k	$k = \alpha/4\pi\tilde\nu$	1
complex refractive index	$\hat n$	$\hat n = n + \mathrm{i}k$	1
molar refraction	R, R_m	$R = \dfrac{(n^2-1)}{(n^2+2)}V_m$	m^3 mol^{-1}
angle of optical rotation	α		1, rad
Solid State			
lattice vector	$\boldsymbol{R}$, $\boldsymbol{R_0}$		m
fundamental translation vectors for the crystal lattice	$\boldsymbol{a_1}$; $\boldsymbol{a_2}$; $\boldsymbol{a_3}$, $\boldsymbol{a}$; $\boldsymbol{b}$; $\boldsymbol{c}$	$\boldsymbol{R} = n_1\boldsymbol{a_1} + n_2\boldsymbol{a_2} + n_3\boldsymbol{a_3}$	m
(circular) reciprocal lattice vector	$\boldsymbol{G}$	$\boldsymbol{G}\cdot\boldsymbol{R} = 2\pi m$	m^{-1}
(circular) fundamental translation vectors for the reciprocal lattice	$\boldsymbol{b_1}$; $\boldsymbol{b_2}$; $\boldsymbol{b_3}$, $\boldsymbol{a}^*$; $\boldsymbol{b}^*$; $\boldsymbol{c}^*$	$\boldsymbol{a_i}\cdot\boldsymbol{b_k} = 2\pi\delta_{ik}$	m^{-1}
lattice plane spacing	d		m
Bragg angle	θ	$n\lambda = 2d\sin\theta$	1, rad
order of reflection	n		1
order parameters			
short range	σ		1
long range	s		1
Burgers vector	$\boldsymbol{b}$		m
particle position vector	$\boldsymbol{r}$, $\boldsymbol{R_j}$		m
equilibrium position vector of an ion	$\boldsymbol{R_0}$		m
displacement vector of an ion	$\boldsymbol{u}$	$\boldsymbol{u} = \boldsymbol{R} - \boldsymbol{R_0}$	m
Debye–Waller factor	B, D		1
Debye circular wavenumber	q_D		m^{-1}
Debye circular frequency	ω_D		s^{-1}
Grüneisen parameter	γ, Γ	$\gamma = \alpha V/\kappa C_v$	1
Madelung constant	α, $\mathcal{M}$	$E_{\mathrm{coul}} = \dfrac{\alpha N_A z_+ z_- e^2}{4\pi\varepsilon_0 R_0}$	1
density of states	N_E	$N_E = \mathrm{d}N(E)/\mathrm{d}E$	J^{-1} m^{-3}
(spectral) density of vibrational modes	N_ω, g	$N_\omega = \mathrm{d}N(\omega)/\mathrm{d}\omega$	s m^{-3}

Name	Symbol	Definition	SI unit
resistivity tensor	ρ_{ik}	$\boldsymbol{E} = \boldsymbol{\rho} \cdot \boldsymbol{j}$	Ω m
conductivity tensor	σ_{ik}	$\sigma = \rho^{-1}$	S m^{-1}
thermal conductivity tensor	λ_{ik}	$\boldsymbol{J}_q = -\boldsymbol{\lambda} \cdot \mathrm{grad}\ T$	W m^{-1} K^{-1}
residual resistivity	ρ_R		Ω m
relaxation time	τ	$\tau = l/v_F$	s
Lorenz coefficient	L	$L = \lambda/\sigma T$	V^2 K^{-2}
Hall coefficient	A_H, $\boldsymbol{R}_H$	$\boldsymbol{E} = \boldsymbol{\rho} \cdot \boldsymbol{j} + R_H(\boldsymbol{B} \times \boldsymbol{j})$	m^3 C^{-1}
thermoelectric force	E		V
Peltier coefficient	Π		V
Thomson coefficient	μ, (τ)		V K^{-1}
work function	Φ	$\Phi = E_\infty - E_F$	J
number density, number concentration	n, (p)		m^{-3}
gap energy	E_g		J
donor ionization energy	E_d		J
acceptor ionization energy	E_a		J
Fermi energy	E_F, ε_F		J
circular wave vector, propagation vector	k, $\boldsymbol{q}$	$k = 2\pi/\lambda$	m^{-1}
Bloch function	$u_k(\boldsymbol{r})$	$\psi(\boldsymbol{r}) = u_k(\boldsymbol{r}) \exp(i\boldsymbol{k} \cdot \boldsymbol{r})$	$m^{-3/2}$
charge density of electrons	ρ	$\rho(\boldsymbol{r}) = -e\psi^*(\boldsymbol{r})\psi(\boldsymbol{r})$	C m^{-3}
effective mass	m^*		kg
mobility	μ	$\mu = v_{drift}/E$	m^2 V^{-1} s^{-1}
mobility ratio	b	$b = \mu_n/\mu_p$	1
diffusion coefficient	D	$\mathrm{d}N/\mathrm{d}t = -DA(\mathrm{d}n/\mathrm{d}x)$	m^2 s^{-1}
diffusion length	L	$L = \sqrt{D\tau}$	m
characteristic (Weiss) temperature	θ, θ_w		K
Curie temperature	T_C		K
Néel temperature	T_N		K
Statistical Thermodynamics			
number of entities	N		1
number density of entities, number concentration	n, C	$n = N/V$	m^{-3}
Avogadro constant	L, N_A		mol^{-1}
Boltzmann constant	k, k_B		J K^{-1}
gas constant (molar)	R	$R = Lk$	J K^{-1} mol^{-1}
molecular position vector	$\boldsymbol{r}$ (x, y, z)		m
molecular velocity vector	$\boldsymbol{c}(c_x, c_y, c_z)$, $\boldsymbol{u}(u_x, u_y, u_z)$	$\boldsymbol{c} = \mathrm{d}\boldsymbol{r}/\mathrm{d}t$	m s^{-1}
molecular momentum vector	$\boldsymbol{p}(p_x, p_y, p_z)$	$\boldsymbol{p} = m\boldsymbol{c}$	kg m s^{-1}
velocity distribution function (Maxwell)	$f(c_x)$	$f(c_x) = (m/2\pi kT)^{1/2} \times \exp(-mc_x^2/2kT)$	m^{-1} s
speed distribution function (Maxwell–Boltzmann)	$F(c)$	$F(c) = (m/2\pi kT)^{3/2} \times 4\pi c^2 \exp(-mc^2/2kT)$	m^{-1} s
average speed	$\bar{c}$, $\bar{u}$, $\langle c \rangle$, $\langle u \rangle$	$\bar{c} = \int cF(c)\mathrm{d}c$	m s^{-1}
generalized coordinate	q		(m)
generalized momentum	p	$p = \partial L/\partial \dot{q}$	(kg m s^{-1})
volume in phase space	Ω	$\Omega = (1/h)\int p\mathrm{d}q$	1
probability	P		1
statistical weight, degeneracy	g, d, W, ω, β		1
density of states	$\rho(E)$	$\rho(E) = \mathrm{d}N/\mathrm{d}E$	J^{-1}
partition function, sum over states, for a single molecule	q, z	$q = \sum_i g_i \exp(-\varepsilon_i/kT)$	1
for a canonical ensemble (system, or assembly)	Q, Z		1
microcanonical ensemble	Ω		1
grand (canonical ensemble)	Ξ		1
symmetry number	σ, s		1
reciprocal temperature parameter	β	$\beta = 1/kT$	J^{-1}
characteristic temperature	Θ		K

Name	Symbol	Definition	SI unit
General Chemistry			
number of entities (e.g. molecules, atoms, ions, formula units)	N		1
amount (of substance)	n	$n_B = N_B/L$	mol
Avogadro constant	L, N_A		mol^{-1}
mass of atom, atomic mass	m_a, m		kg
mass of entity (molecule, or formula unit)	m_f, m		kg
atomic mass constant	m_u	$m_u = m_a(^{12}C)/12$	kg
molar mass	M	$M_B = m/n_B$	kg mol^{-1}
relative molecular mass (relative molar mass, molecular weight)	M_r	$M_{r,B} = m_B/m_u$	1
molar volume	V_m	$V_{m,B} = V/n_B$	m^3 mol^{-1}
mass fraction	w	$w_B = m_B/\Sigma m_i$	1
volume fraction	ϕ	$\phi_B = V_B/\Sigma V_i$	1
mole fraction, amount fraction, number fraction	x, y	$x_B = n_B/\Sigma n_i$	1
(total) pressure	p, P		Pa
partial pressure	p_B	$p_B = y_B p$	Pa
mass concentration (mass density)	γ, ρ	$\gamma_B = m_B/V$	kg m^{-3}
number concentration, number density of entities	C, n	$C_B = N_B/V$	m^{-3}
amount concentration, concentration	c	$c_B = n_B/V$	mol m^{-3}
solubility	s	$s_B = c_B$ (saturated solution)	mol m^{-3}
molality (of a solute)	m, (b)	$m_B = n_B/m_A$	mol kg^{-1}
surface concentration	Γ	$\Gamma_B = n_B/A$	mol m^{-2}
stoichiometric number	ν		1
extent of reaction, advancement	ξ	$\Delta\xi = \Delta n_B/\nu_B$	mol
degree of dissociation	α		1
Chemical Thermodynamics			
heat	q, Q		J
work	w, W		J
internal energy	U	$\Delta U = q + w$	J
enthalpy	H	$H = U + pV$	J
thermodynamic temperature	T		K
Celsius temperature	θ, t	$\theta/°C = T/K - 273.15$	°C
entropy	S	$dS \geq dq/T$	J K^{-1}
Helmholtz energy, (Helmholtz function)	A	$A = U - TS$	J
Gibbs energy, (Gibbs function)	G	$G = H - TS$	J
Massieu function	J	$J = -A/T$	J K^{-1}
Planck function	Y	$Y = -G/T$	J K^{-1}
surface tension	γ, σ	$\gamma = (\partial G/\partial A_s)_{T,p}$	J m^{-2}, N m^{-1}
molar quantity X	X_m	$X_m = X/n$	(varies)
specific quantity X	x	$x = X/m$	(varies)
pressure coefficient	β	$\beta = (\partial p/\partial T)v$	Pa K^{-1}
relative pressure coefficient	α_p	$\alpha_p = (1/p)(\partial p/\partial T)_V$	K^{-1}
compressibility,			
isothermal	κ_T	$\kappa_T = -(1/V)(\partial V/\partial p)_T$	Pa^{-1}
isentropic	κ_S	$\kappa_S = -(1/V)(\partial V/\partial p)_S$	Pa^{-1}
linear expansion coefficient	α_l	$\alpha_l = (1/l)(\partial l/\partial T)$	K^{-1}
cubic expansion coefficient	α, α_V, γ	$\alpha = (1/V)(\partial V/\partial T)_p$	K^{-1}
heat capacity,			
at constant pressure	C_p	$C_p = (\partial H/\partial T)_p$	J K^{-1}
at constant volume	C_V	$C_V = (\partial U/\partial T)_V$	J K^{-1}
ratio of heat capacities	γ, (κ)	$\gamma = C_p/C_V$	1
Joule–Thomson coefficient	μ, μ_{JT}	$\mu = (\partial T/\partial p)_H$	K Pa^{-1}
second virial coefficient	B	$pV_m = RT(1 + B/V_m + \ldots)$	m^3 mol^{-1}
compression factor (compressibility factor)	Z	$Z = pV_m/RT$	1
partial molar quantity X	X_B, (X'_B)	$X_B = (\partial X/\partial n_B)_{T,p,n_{j\neq B}}$	(varies)
chemical potential (partial molar Gibbs energy)	μ	$\mu_B = (\partial G/\partial n_B)_{T,p,n_{j\neq B}}$	J mol^{-1}
absolute activity	λ	$\lambda_B = \exp(\mu_B/RT)$	1

Name	Symbol	Definition	SI unit
standard chemical potential	$\mu^{\ominus}$, μ^{o}		J mol^{-1}
standard partial molar enthalpy	$H_B^{\ominus}$	$H_B^{\ominus} = \mu_B^{\ominus} + TS_B^{\ominus}$	J mol^{-1}
standard partial molar entropy	$S_B^{\ominus}$	$S_B^{\ominus} = -(\partial\mu_B^{\ominus}/\partial T)_p$	J mol^{-1} K^{-1}
standard reaction Gibbs energy (function)	$\Delta_r G^{\ominus}$	$\Delta_r G^{\ominus} = \sum_B \nu_B \mu_B^{\ominus}$	J mol^{-1}
affinity of reaction	A, $(\mathcal{A})$	$A = -(\partial G/\partial\xi)_{p,T} = -\sum_B \nu_B \mu_B$	J mol^{-1}
standard reaction enthalpy	$\Delta_r H^{\ominus}$	$\Delta_r H^{\ominus} = \sum_B \nu_B H_B^{\ominus}$	J mol^{-1}
standard reaction entropy	$\Delta_r S^{\ominus}$	$\Delta_r S^{\ominus} = \sum_B \nu_B S_B^{\ominus}$	J mol^{-1} K^{-1}
equilibrium constant	$K^{\ominus}$, K	$K^{\ominus} = \exp(-\Delta_r G^{\ominus}/RT)$	1
equilibrium constant,			
pressure basis	K_p	$K_p = \prod_B p_B^{\nu_B}$	Pa$^{\Sigma\nu}$
concentration basis	K_c	$K_c = \prod_B c_B^{\nu_B}$	(mol m^{-3})$^{\Sigma\nu}$
molality basis	K_m	$K_m = \prod_B m_B^{\nu_B}$	(mol kg^{-1})$^{\Sigma\nu}$
fugacity	f, $\tilde{p}$	$f_B = \lambda_B \lim_{p\to 0}(p_B/\lambda_B)_T$	Pa
fugacity coefficient	ϕ	$\phi_B = f_B/p_B$	1
activity and activity coefficient referenced to Raoult's law, (relative) activity	a	$a_B = \exp\left[\frac{\mu_B - \mu_B^*}{RT}\right]$	1
activity coefficient	f	$f_B = a_B/x_B$	1
activities and activity coefficients referenced to Henry's law, (relative) activity,			
molality basis	a_m	$a_{m,B} = \exp\left[\frac{\mu_B - \mu_B^{\ominus}}{RT}\right]$	1
concentration basis	a_c	$a_{c,B} = \exp\left[\frac{\mu_B - \mu_B^{\circledcirc}}{RT}\right]$	1
mole fraction basis	a_x	$a_{x,B} = \exp\left[\frac{\mu_B - \mu_B^{\circledcirc}}{RT}\right]$	1
activity coefficient,			
molality basis	γ_m	$a_{m,B} = \gamma_{m,B} m_B/m^{\ominus}$	1
concentration basis	γ_c	$a_{c,B} = \gamma_{c,B} c_B/c^{\ominus}$	1
mole fraction basis	γ_x	$a_{x,B} = \gamma_{x,B} x_B$	1
ionic strength,			
molality basis	I_m, I	$I_m = \frac{1}{2}\Sigma m_B z_B^2$	mol kg^{-1}
concentration basis	I_c, I	$I_c = \frac{1}{2}\Sigma c_B z_B^2$	mol m^{-3}
osmotic coefficient,			
molality basis	ϕ_m	$\phi_m = (\mu_A^* - \mu_A)/(RTM_A\Sigma m_B)$	1
mole fraction basis	ϕ_x	$\phi_x = (\mu_A - \mu_A^*)/(RT\ln x_A)$	1
osmotic pressure	Π	$\Pi = c_B RT$ (ideal dilute solution)	Pa

(i) Symbols used as subscripts to denote a chemical process or reaction

These symbols should be printed in roman (upright) type, without a full stop (period).

vaporization, evaporation (liquid → gas)	vap
sublimation (solid → gas)	sub
melting, fusion (solid → liquid)	fus
transition (between two phases)	trs
mixing of fluids	mix
solution (of solute in solvent)	sol
dilution (of a solution)	dil
adsorption	ads
displacement	dpl
immersion	imm

Name	Symbol	Definition	SI unit
	reaction in general	r	
	atomization	at	
	combustion reaction	c	
	formation reaction	f	
(ii) Recommended superscripts			
	standard	$^{\ominus}$, ^{o}	
	pure substance	*	
	infinite dilution	$^{\infty}$	
	ideal	id	
	activated complex, transition state	‡	
	excess quantity	^{E}	
Chemical Kinetics			
rate of change of quantity X	$\dot{X}$	$\dot{X} = \mathrm{d}X/\mathrm{d}t$	(varies)
rate of conversion	$\dot{\xi}$	$\dot{\xi} = \mathrm{d}\xi/\mathrm{d}t$	mol s^{-1}
rate of concentration change (due to chemical reaction)	r_B,ν_B	$r_B = \mathrm{d}c_B/\mathrm{d}t$	mol m^{-3} s^{-1}
rate of reaction (based on amount concentration)	ν	$\nu = \dot{\xi}/V = \nu_B^{-1}\mathrm{d}c_B/\mathrm{d}t$	mol m^{-3} s^{-1}
partial order of reaction	n_B	$\nu = k\Pi c_B{}^{n_B}$	1
overall order of reaction	n	$n = \Sigma n_B$	1
rate constant, rate coefficient	k	$\nu = k\Pi c_B{}^{n_B}$	(mol^{-1} m^3)$^{n-1}$ s^{-1}
Boltzmann constant	k, k_B		J K^{-1}
half life	$t_{1/2}$	$c(t_{1/2}) = c_0/2$	s
relaxation time	τ	$\tau = 1/(k_1 + k_{-1})$	s
energy of activation, activation energy	E_a, E	$E_a = RT^2\,\mathrm{d}\ln k/\mathrm{d}T$	J mol^{-1}
pre–exponential factor	A	$k = A\exp(-E_a/RT)$	(mol^{-1} m^3)$^{n-1}$ s^{-1}
volume of activation	$\Delta^{\ddagger}V$	$\Delta^{\ddagger}V = -RT \times (\partial\ln k/\partial p)_T$	m^3 mol^{-1}
collision diameter	d	$d_{AB} = r_A + r_B$	m
collision cross–section	σ	$\sigma_{AB} = \pi d_{AB}{}^2$	m^2
collision frequency	Z_A		s^{-1}
collision number	Z_{AB}, Z_{AA}		m^{-3} s^{-1}
collision frequency factor	z_{AB}, z_{AA}	$z_{AB} = Z_{AB}/Lc_Ac_B$	m^3 mol^{-1} s^{-1}
standard enthalpy of activation	$\Delta^{\ddagger}H^{\ominus}$, $\Delta H^{\ddagger}$		J mol^{-1}
standard entropy of activation	$\Delta^{\ddagger}S^{\ominus}$, $\Delta S^{\ddagger}$		J mol^{-1} K^{-1}
standard Gibbs energy of activation	$\Delta^{\ddagger}G^{\ominus}$, $\Delta G^{\ddagger}$		J mol^{-1}
quantum yield, photochemical yield	ϕ		1
Electrochemistry			
elementary charge (proton charge)	e		C
Faraday constant	F	$F=eL$	C mol^{-1}
charge number of an ion	z	$z_B = Q_B/e$	1
ionic strength	I_c, I	$I_c = \tfrac{1}{2}\,\Sigma c_i z_i{}^2$	mol m^{-3}
mean ionic activity	$a_{\pm}$	$a_{\pm} = m_{\pm}\gamma_{\pm}/m^{\ominus}$	1
mean ionic molality	$m_{\pm}$	$m_{\pm}{}^{(\nu_+ + \nu_-)} = m_+{}^{\nu_+} m_-{}^{\nu_-}$	mol kg^{-1}
mean ionic activity coefficient	$\gamma_{\pm}$	$\gamma_{\pm}{}^{(\nu_+ + \nu_-)} = \gamma_+{}^{\nu_+}\gamma_-{}^{\nu_-}$	1
charge number of electrochemical cell reaction	n, (z)		1
electric potential difference (of a galvanic cell)	ΔV, E, U	$\Delta V = V_R - V_L$	V
emf, electromotive force	E	$E = \lim_{I\to 0}\Delta V$	V
standard emf, standard potential of the electrochemical cell reaction	$E^{\ominus}$	$E^{\ominus} = -\Delta_r G^{\ominus}/nF = (RT/nF)\ln K^{\ominus}$	V
standard electrode potential	$E^{\ominus}$		V
emf of the cell, potential of the electrochemical cell reaction	E	$E = E^{\ominus} - (RT/nF) \times \Sigma\nu_i \ln a_i$	V
pH	pH	$\mathrm{pH} \approx -\lg\left[\dfrac{c(\mathrm{H}^+)}{\mathrm{mol\ dm}^{-3}}\right]$	1
inner electric potential	ϕ	$\nabla\phi = -\boldsymbol{E}$	V

Name	Symbol	Definition	SI unit
outer electric potential	ψ	$\psi = Q/4\pi\varepsilon_0 r$	V
surface electric potential	χ	$\chi = \phi - \psi$	V
Galvani potential difference	$\Delta\phi$	$\Delta_\alpha^\beta\phi = \phi^\beta - \phi^\alpha$	V
volta potential difference	$\Delta\psi$	$\Delta_\alpha^\beta\psi = \psi^\beta - \psi^\alpha$	V
electrochemical potential	$\tilde{\mu}$	$\tilde{\mu}_B{}^\alpha = (\partial G/\partial n_B{}^\alpha)$	J mol^{-1}
electric current	I	$I = \mathrm{d}Q/\mathrm{d}t$	A
(electric) current density	j	$j = I/A$	A m^{-2}
(surface) charge density	σ	$\sigma = Q/A$	C m^{-2}
electrode reaction rate constant	k	$k_{ox} = I_a/(nFA\prod_i c_i^{n_i})$	(varies)
mass transfer coefficient, diffusion rate constant	k_d	$k_{d,B} = \lvert\nu_B\rvert I_{l,B}/nFcA$	m s^{-1}
thickness of diffusion layer	δ	$\delta_B = D_B/k_{d,B}$	m
transfer coefficient (electrochemical)	α	$\alpha_c = \frac{-\lvert\nu\rvert RT}{nF}\frac{\partial \ln\lvert I_c\rvert}{\partial E}$	1
overpotential	η	$\eta = E_I - E_{I=0} - IR_u$	V
electrokinetic potential (zeta potential)	ζ		V
conductivity	κ, (σ)	$\kappa = j/E$	S m^{-1}
conductivity cell constant	K_{cell}	$K_{cell} = \kappa R$	m^{-1}
molar conductivity (of an electrolyte)	Λ	$\Lambda_B = \kappa/c_B$	S m^2 mol^{-1}
ionic conductivity, molar conductivity of an ion	λ	$\lambda_B = \lvert z_B\rvert F u_B$	S m^2 mol^{-1}
electric mobility	u, (μ)	$u_B = \nu_B/E$	m^2 V^{-1} s^{-1}
transport number	t	$t_B = j_B/\Sigma j_i$	1
reciprocal radius of ionic atmosphere	κ	$\kappa = (2F^2I/\varepsilon RT)^{1/2}$	m^{-1}
Colloid and Surface Chemistry			
specific surface area	a, a_s, s	$a = A/m$	m^2 kg^{-1}
surface amount of B, adsorbed amount of B	n_B^s, n_B^a		mol
surface excess of B	n_B^σ		mol
surface excess concentration of B	Γ_B, (Γ_B^σ)	$\Gamma_B = n_B^\sigma/A$	mol m^{-2}
total surface excess concentration	Γ, (Γ^σ)	$\Gamma = \sum_i \Gamma_i$	mol m^{-2}
area per molecule	a, σ	$a_B = A/N_B^\sigma$	m^2
area per molecule in a filled monolayer	a_m, σ_m	$a_{m,B} = A/N_{m,B}$	m^2
surface coverage	θ	$\theta = N_B^\sigma/N_{m,B}$	1
contact angle	θ		1, rad
film thickness	t, h, δ		m
thickness of (surface or interfacial) layer	τ, δ, t		m
surface tension, interfacial tension	γ, σ	$\gamma = (\partial G/\partial A_s)_{T,p}$	N m^{-1}, J m^{-2}
film tension	Σ_f	$\Sigma_f = 2\gamma_f$	N m^{-1}
reciprocal thickness of the double layer	κ	$\kappa = [2F^2I_c/\varepsilon RT]^{1/2}$	m^{-1}
average molar masses			
number–average	M_n	$M_n = \Sigma n_i M_i/\Sigma n_i$	kg mol^{-1}
mass–average	M_m	$M_m = \Sigma n_i M_i^2/\Sigma n_i M_i$	kg mol^{-1}
Z–average	M_Z	$M_Z = \Sigma n_i M_i^3/\Sigma n_i M_i^2$	kg mol^{-1}
sedimentation coefficient	s	$s = v/a$	s
van der Waals constant	λ		J
retarded van der Waals constant	β, B		J
van der Waals–Hamaker constant	A_H		J
surface pressure	π^s, π	$\pi^s = \gamma^0 - \gamma$	N m^{-1}
Transport Properties			
flux (of a quantity X)	J_X, J	$J_X = A^{-1}\,\mathrm{d}X/\mathrm{d}t$	(varies)
volume flow rate	q_V, $\dot{V}$	$q_v = \mathrm{d}V/\mathrm{d}t$	m^3 s^{-1}
mass flow rate	q_m, $\dot{m}$	$q_m = \mathrm{d}m/\mathrm{d}t$	kg s^{-1}
mass transfer coefficient	k_d		m s^{-1}
heat flow rate	ϕ	$\phi = \mathrm{d}q/\mathrm{d}t$	W
heat flux	J_q	$J_q = \phi/A$	W m^{-2}
thermal conductance	G	$G = \phi/\Delta T$	W K^{-1}
thermal resistance	R	$R = 1/G$	K W^{-1}

Name	Symbol	Definition	SI unit
thermal conductivity	λ, k	$\lambda = J_q/(\mathrm{d}T/\mathrm{d}l)$	$\mathrm{W\ m^{-1}\ K^{-1}}$
coefficient of heat transfer	h, (k, K, α)	$h = J_q/\Delta T$	$\mathrm{W\ m^{-2}\ K^{-1}}$
thermal diffusivity	a	$a = \lambda/\rho c_p$	$\mathrm{m^2\ s^{-1}}$
diffusion coefficient	D	$D = J_n/(\mathrm{d}c/\mathrm{d}l)$	$\mathrm{m^2\ s^{-1}}$

The following symbols are used in the definitions of the dimensionless quantities: mass (m), time (t), volume (V), area (A), density (ρ), speed (v), length (l), viscosity (η), pressure (p), acceleration of free fall (g), cubic expansion coefficient (α), temperature (T), surface tension (γ), speed of sound (c), mean free path (λ), frequency (f), thermal diffusivity (a), coefficient of heat transfer (h), thermal conductivity (k), specific heat capacity at constant pressure (c_p), diffusion coefficient (D), mole fraction (x), mass transfer coefficient (k_d), permeability (μ), electric conductivity (κ), and magnetic flux density (B).

Name	Symbol	Definition	SI unit
Reynolds number	Re	$Re = pvl/\eta$	1
Euler number	Eu	$Eu = \Delta p/\rho v^2$	1
Froude number	Fr	$Fr = v/(lg)^{1/2}$	1
Grashof number	Gr	$Gr = l^3 g\alpha\Delta T\rho^2/\eta^2$	1
Weber number	We	$We = \rho v^2 l/\gamma$	1
Mach number	Ma	$Ma = v/c$	1
Knudsen number	Kn	$Kn = \lambda/l$	1
Strouhal number	Sr	$Sr = lf/v$	1
Fourier number	Fo	$Fo = at/l^2$	1
Péclet number	Pe	$Pe = vl/a$	1
Rayleigh number	Ra	$Ra = l^3 g\alpha\Delta T\rho/\eta a$	1
Nusselt number	Nu	$Nu = hl/k$	1
Stanton number	St	$St = h/\rho v c_p$	1
Fourier number for mass transfer	Fo^*	$Fo^* = Dt/l^2$	1
Péclet number for mass transfer	Pe^*	$Pe^* = vl/D$	1
Grashof number for mass transfer	Gr^*	$Gr^* = l^3 g\left(\frac{\partial\rho}{\partial x}\right)_{T,p}\left(\frac{\Delta x\rho}{\eta}\right)$	1
Nusselt number for mass transfer	Nu^*	$Nu^* = k_d l/D$	1
Stanton number for mass transfer	St^*	$St^* = k_d/v$	1
Prandtl number	Pr	$Pr = \eta/\rho a$	1
Schmidt number	Sc	$Sc = \eta/\rho D$	1
Lewis number	Le	$Le = a/D$	1
magnetic Reynolds number	Rm, Re_m	$Rm = v\mu\kappa l$	1
Alfvén number	Al	$Al = v(\rho\mu)^{1/2}/B$	1
Hartmann number	Ha	$Ha = Bl\,(\kappa/\eta)^{1/2}$	1
Cowling number	Co	$Co = B^2/\mu\rho v^2$	1

NOMENCLATURE OF CHEMICAL COMPOUNDS

The International Union of Pure and Applied Chemistry (IUPAC) maintains several commissions that deal with the naming of chemical substances. In general, the approach of IUPAC is to present rules for arriving at names in a systematic manner, rather than recommending a unique name for each compound. Thus there are often several alternative "IUPAC names", depending on which nomenclature system is used, each of which may have advantages in specific applications. However, each of these names will be unambiguous.

Organizations such as the Chemical Abstacts Service and the Beilstein Institute that prepare indexes to the chemical literature must adopt a system for selecting unique names in order to avoid excessive cross referencing. Chemical Abstracts Service uses a system which groups together compounds derived from a single parent compound. Thus most index names are inverted (e.g., Benzene, bromo rather than bromobenzene; Acetic acid, sodium salt rather than sodium acetate).

Recommended names for the most common substituent groups, ligands, ions, and organic rings are given in the two following tables, "Nomenclature for Inorganic Ions and Ligands" and "Organic Substituent Groups and Ring Systems". For the basics of macromolecular nomenclature, see "Nomenclature for Organic Polymers" in Section 13.

Some of the most useful recent guides to chemical nomenclature, prepared by IUPAC and other organizations such as the International Union of Biochemistry and Molecular Biology (IUBMB) and the American Chemical Society are listed below . These books contain citations to the more detailed nomenclature documents in each area. Two very useful web sites providing links to nomenclature documents are:

www.iupac.org/publications/index.html
www.chem.qmul.ac.uk/iupac/

Inorganic Chemistry

Nomenclature of Inorganic Chemistry - IUPAC Recommendations 2005. Connelly, N.G., Damhus, T., Hartshorn, R. M., and Hutton, A. T. The Royal Society of Chemistry, 2005.

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International Union of Pure and Applied Chemistry, *Glossary of Class Names of Organic Compounds and Reactive Intermediates Based on Structure*, Moss, G. P., Smith, P. A. S., and Tavernier, D., Eds., *Pure & Appl. Chem*, 67, 1307, 1995.

Rhodes, P. H., *The Organic Chemist's Desk Reference*, Chapman & Hall, London, 1995.

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Macromolecular Chemistry

International Union of Pure and Applied Chemistry, *Compendium of Macromolecular Nomenclature*, Metanomski, W. V., Ed., Blackwell Scientific Publications, Oxford, 1991.

International Union of Pure and Applied Chemistry, *Glossary of Basic Terms in Polymer Science*, Jenkins, A.D., Kratochvil, P., Stepto, R. F. T., and Suter, U. W., Eds., *Pure & Appl. Chem*, 68, 2287, 1996.

Biochemistry

International Union of Biochemistry and Molecular Biology, *Biochemical Nomenclature and Related Documents, 2nd Edition, 1992*, Portland Press, London, 1993; includes recommendations of the IUPAC-IUBMB Joint Commission on Biochemical Nomenclature.

International Union of Biochemistry and Molecular Biology, *Enzyme Nomenclature, 1992*, Academic Press, Orlando, FL, 1992.

IUPAC-IUBMB Joint Commission on Biochemical Nomenclature, *Nomenclature of Carbohydrates, Recommendations 1996*, McNaught, A. D., Ed., *Pure & Appl. Chem.*, 68, 1919, 1996.

General

Principles of Chemical Nomenclature: a Guide to IUPAC Recommendations, Leigh, G. J., Favre, H. A. and Metanomski, W. V., Blackwell Science, 1998.

Chemical Abstracts Service, *Naming and Indexing Chemical Substances for Chemical Abstracts, Appendix IV, Chemical Abstracts 1994 Index Guide.*

NOMENCLATURE FOR INORGANIC IONS AND LIGANDS

Willem H. Koppenol

The entries below were selected from Table IX of Connelly, N. G., Damhus, T., Hartshorn, R. M. and Hutton, A. T., Eds., *Nomenclature of Inorganic Chemistry. IUPAC Recommendations 2005*, The Royal Society of Chemistry, 2005. Two changes were made: in the case of the hypohalides, the oxidohalogenate names are listed, not the new halooxygenate names. Thus, for BrO^- the still acceptable name "oxidobromate(1–)" is listed, not the more correct, but less palatable, "bromooxygenate(1–)". Similarly, and for reasons of consistency, $ClO^\bullet$ is not named oxygen (mono)chloride, but chlorine mono(o)oxide. The symbol '⁀' is used for dividing names when this is made necessary by a line break. When the name is reconstructed from the name given in the table, this symbol should be omitted. Thus, all *hyphens* in the table are true parts of the names. The symbols '>' and '<' placed next to an element symbol both denote two single bonds connecting the atom in question to two other atoms. For a given compound, the various systematic names, if applicable, are given in the order: stoichiometric names, substitutive names, additive names and hydrogen names. Acceptable names which are not entirely systematic (or not formed according to any of the systems mentioned above) are given at the end after a semicolon. No order of preference is implied by the order in which formulae and names are listed. Reprinted by permission of IUPAC.

Formula for uncharged atom or group	**Name**			
	Uncharged atoms or molecules (including zwitterions and radicals) or substituent groups[a]	***Cations (including cation radicals) or cationic substituent groups***[a]	***Anions (including anion radicals) or anionic substituent groups***[b]	***Ligands***[c]
H	hydrogen $H^\bullet$, hydrogen(•), monohydrogen (natural or unspecified isotopic composition) $^1H^\bullet$, protium(•), monoprotium $^2H^\bullet = D^\bullet$, deuterium(•), monodeuterium $^3H^\bullet = T^\bullet$, tritium(•), monotritium	hydrogen (general) H^+, hydrogen(1+), hydron (natural or unspecified isotopic composition) $^1H^+$, protium(1+), proton $^2H^+ = D^+$, deuterium(1+), deuteron $^3H^+ = T^+$, tritium(1+), triton	hydride (general) H^-, hydride (natural or unspecified isotopic composition) $^1H^-$, protide $^2H^- = D^-$, deuteride $^3H^- = T^-$, tritide	hydrido protido deuterido tritido
H_2	H_2, dihydrogen D_2, dideuterium T_2, ditritium	$H_2^{\bullet+}$, dihydrogen(•1+) $^1H_2^{\bullet+}$, diprotium(•1+) $D_2^{\bullet+}$, dideuterium(•1+) $T_2^{\bullet+}$, ditritium(•1+)		
D, see H				
D_2, see H_2				
T, see H				
T_2, see H_2				
F	fluorine $F^\bullet$, fluorine(•), monofluorine –F, fluoro	fluorine (general) F^+, fluorine(1+)	fluoride (general) F^-, fluoride(1–); fluoride	fluorido (general) F^-, fluorido(1–); fluorido
F_2	F_2, difluorine	$F_2^{\bullet+}$, difluorine(•1+)	$F_2^{\bullet-}$, difluoride(•1–)	F_2, difluorine
Cl	chlorine (general) $Cl^\bullet$, chlorine(•), monochlorine –Cl, chloro	chlorine (general) Cl^+, chlorine(1+)	chloride (general) Cl^-, chloride(1–); chloride	chlorido (general) Cl^-, chlorido(1–); chlorido
Cl_2	Cl_2, dichlorine	$Cl_2^{\bullet+}$, dichlorine(•1+)	$Cl_2^{\bullet-}$, dichloride(•1–)	Cl_2, dichlorine $Cl_2^{\bullet-}$, dichlorido(•1–)
Br	bromine (general) $Br^\bullet$, bromine(•), monobromine –Br, bromo	bromine (general) Br^+, bromine(1+)	bromide (general) Br^-, bromide(1–); bromide	bromido (general) Br^-, bromido(1–); bromido
Br_2	Br_2, dibromine	$Br_2^{\bullet+}$, dibromine(•1+)	$Br_2^{\bullet-}$, dibromide(•1–)	Br_2, dibromine
I	iodine (general) $I^\bullet$, iodine(•), monoiodine –I, iodo	iodine (general) I^+, iodine(1+)	iodide (general) I^-, iodide(1–); iodide	iodido (general) I^-, iodido(1–); iodido
I_2	I_2, diiodine	$I_2^{\bullet+}$, diiodine(•1+)	$I_2^{\bullet-}$, diiodide(•1–)	I_2, diiodine

ClO	ClO, chlorine mon(o)oxide $ClO^{\bullet}$, oxidochlorine(•); chlorosyl –ClO, oxo-λ^3-chloranyl; chlorosyl –OCl, chlorooxy		ClO^-, oxidochlorate(1–); hypochlorite	ClO^-, oxidochlorato(1–); hypochlorito
ClO_2	ClO_2, chlorine dioxide $ClO_2^{\bullet}$, dioxidochlorine(•) $ClOO^{\bullet}$, chloridodioxygen ⊂⊃ (*O–O*) (•), $–ClO_2$, dioxo-λ^5-chloranyl; chloryl –OClO, oxo-λ^3-chloranyloxy	ClO_2^+, dioxidochlorine(1+) (*not* chloryl)	ClO_2^-, dioxidochlorate(1–); chlorite	ClO_2^-, dioxidochlorato(1–); chlorito
ClO_3	ClO_3, chlorine trioxide $ClO_3^{\bullet}$, trioxidochlorine(•) $–ClO_3$, trioxo-λ^7-chloranyl; perchloryl $–OClO_2$, dioxo-λ^5-chloranyloxy	ClO_3^+, trioxidochlorine(1+) (*not* perchloryl)	ClO_3^-, trioxidochlorate(1–); chlorate	ClO_3^-, trioxidochlorato(1–); chlorato
ClO_4	ClO_4, chlorine tetraoxide $ClO_4^{\bullet}$, tetraoxidochlorine(•) $–OClO_3$, trioxo-λ^7-chloranyloxy		ClO_4^-, tetraoxidochlorate(1–); perchlorate	ClO_4^-, tetraoxidochlorato(1–); perchlorato
IO	IO, iodine mon(o)oxide $IO^{\bullet}$, oxidoiodine(•); iodosy l –IO, oxo-λ^3-iodanyl; iodosyl –OI, iodooxy	IO^+, oxidoiodine(1+) (*not* iodosyl)	IO^-, oxidoiodate(1–); hypoiodite $IO^{\bullet 2-}$, oxidoiodate(•2–)	IO^-, oxidoiodato(1–); hypoiodito
IO_2	IO_2, iodine dioxide $IO_2^{\bullet}$, dioxidoiodine(•) $–IO_2$, dioxo-λ^5-iodanyl; iodyl –OIO, oxo-λ^3-iodanyloxy	IO_2^+, dioxidoiodine(1+) (*not* iodyl)	IO_2^-, dioxidoiodate(1–); iodite	IO_2^-, dioxidoiodato(1–); iodito
IO_3	IO_3, iodine trioxide $IO_3^{\bullet}$, trioxidoiodine(•) $–IO^3$, trioxo-λ^7-iodanyl; periodyl $–OIO_2$, dioxo-λ^5-iodanyloxy	IO_3^+, trioxidoiodine(1+) (*not* periodyl)	IO_3^-, trioxidoiodate(1–); iodate	IO_3^-, trioxidoiodato(1–); iodato
IO_4	IO_4, iodine tetraoxide $IO_4^{\bullet}$, tetraoxidoiodine(•) $–OIO_3$, trioxo-λ^7-iodanyloxy		IO_4^-, tetraoxidoiodate(1–); periodate	IO_4^-, tetraoxidoiodato(1–); periodato
O	oxygen (general) O, monooxygen $O^{2\bullet}$, oxidanylidene, monooxygen(2•) >O, oxy, epoxy (in rings) =O, oxo	oxygen (general) $O^{\bullet+}$, oxygen(•1+)	oxide (general) $O^{\bullet-}$, oxidanidyl, oxide(•1–) O^{2-}, oxide(2–); oxide $–O^-$, oxido	O^{2-}, oxido
O_2	O_2, dioxygen $O_2^{2\bullet}$, dioxidanediyl, dioxygen(2•) –OO–, dioxidanediyl; peroxy	$O_2^{\bullet+}$, dioxidanyliumyl, dioxygen(•1+) O_2^{2+}, dioxidanebis(ylium), dioxygen(2+)	$O_2^{\bullet-}$, dioxidanidyl, dioxide(•1–); superoxide (*not* hyperoxide) O_2^{2-}, dioxidanediide, dioxide(2–); peroxide	dioxido (general) O_2, dioxygen $O_2^{\bullet-}$, dioxido(•1–); superoxido O_2^{2-}, dioxidanediido, dioxido(2–); peroxido
O_3	O_3, trioxygen; ozone –OOO–, trioxidanediyl		$O_3^{\bullet-}$, trioxidanidyl, trioxide(•1–); ozonide	O_3, trioxygen; ozone $O_3^{\bullet-}$, trioxido(•1–); ozonido
HO	$HO^{\bullet}$, oxidanyl, hydridooxygen(•); hydroxyl –OH, oxidanyl; hydroxy	HO^+, oxidanylium, hydridooxygen(1+); hydroxylium	HO^-, oxidanide, hydroxide	HO^-, oxidanido; hydroxido
HO_2	$HO_2^{\bullet}$, dioxidanyl, hydridodioxygen(•) hydrogen dioxide –OOH, dioxidanyl; hydroperoxy	HO_2^+, dioxidanylium, hydridodioxygen(1+)	HO_2^-, dioxidanide, hydrogen(peroxide)(1–)	HO_2^-, dioxidanido, hydrogen(peroxido)(1–)
S	sulfur (general) S, monosulfur =S, sulfanylidene; thioxo –S–, sulfanediyl	sulfur (general) S^+, sulfur(1+)	sulfide (general) $S^{\bullet-}$, sulfanidyl, sulfide(•1–) S^{2-}, sulfanediide, sulfide(2–); sulfide $–S^-$, sulfido	sulfido (general) $S^{\bullet-}$, sulfanidyl, sulfido(•1–) S^{2-}, sulfanediido, sulfido(2–)

S_2	S_2, disulfur –SS–, disulfanediyl >S=S, sulfanylidene-λ^4-sulfanediyl; sulfinothioyl	$S_2^{\bullet+}$, disulfur(•1+)	$S_2^{\bullet-}$, disulfanidyl, disulfide(•1–) S_2^{2-}, disulfide(2–), disulfanediide –SS$^-$, disulfanidyl	S_2^{2-}, disulfido(2–), disulfanediido
HS	HS$^\bullet$, sulfanyl, hydridosulfur(•) –SH, sulfanyl	HS$^+$, sulfanylium, hydridosulfur(1+)	HS$^-$, sulfanide, hydrogen(sulfide)(1–)	HS$^-$, sulfanido, hydrogen(sulfido)(1–)
SO	SO, sulfur mon(o)oxide [SO], oxidosulfur >SO, oxo-λ^4-sulfanediyl; sulfinyl	SO$^{\bullet+}$, oxidosulfur(•1+) *(not* sulfinyl or thionyl)	SO$^{\bullet-}$, oxidosulfate(•1–)	[SO], oxidosulfur
SO_2	SO_2, sulfur dioxide [SO_2], dioxidosulfur >SO_2, dioxo-λ^6-sulfanediyl; sulfuryl, sulfonyl		$SO_2^{\bullet-}$, dioxidosulfate(•1–) SO_2^{2-}, dioxidosulfate(2–), sulfanediolate	[SO_2], dioxidosulfur SO_2^{2-}, dioxidosulfato(2–), sulfanediolato
SO_3	SO_3, sulfur trioxide		$SO_3^{\bullet-}$, trioxidosulfate(•1–) SO_3^{2-}, trioxidosulfate(2–); sulfite –S(O)$_2$(O$^-$), oxidodioxo-λ^6-sulfanyl; sulfonato	SO_3^{2-}, trioxidosulfato(2–); sulfito
SO_4	–OS(O)$_2$O–, sulfonylbis(oxy)		$SO_4^{\bullet-}$, tetraoxidosulfate(•1–) SO_4^{2-}, tetraoxidosulfate(2–); sulfate	SO_4^{2-}, tetraoxidosulfato(2–); sulfato
S_2O_3			$S_2O_3^{\bullet-} = SO_3S^{\bullet-}$, trioxido-1$\kappa^3$*O*-disulfate(*S*–*S*)(•1–), trioxidosulfidosulfate(•1–) $S_2O_3^{2-} = SO_3S^{2-}$, trioxido-1κ^3*O*-disulfate(*S*–*S*)(2–), trioxidosulfidosulfate(2–); thiosulfate, sulfurothioate	$S_2O_3^{2-} = SO_3S^{2-}$, trioxido-1κ^3*O*-disulfato(*S*–*S*)(2–), trioxidosulfidosulfato(2–); thiosulfato, sulfurothioato
Se	Se (general) Se, monoselenium >Se, selanediyl =Se, selanylidene; selenoxo	selenium	selenide (general) Se$^{\bullet-}$, selanidyl, selenide(•1–) Se^{2-}, selanediide, selenide(2–); selenide	selenido (general) Se$^{\bullet-}$, selanidyl, selenido(•1–) Se^{2-}, selanediido, selenido(2–)
SeO	SeO, selenium mon(o)oxide [SeO], oxidoselenium >SeO, seleninyl			[SeO], oxidoselenium
SeO_2	SeO_2, selenium dioxide [SeO_2], dioxidoselenium >SeO_2, selenonyl		SeO_2^{2-}, dioxidoselenate(2–)	[SeO_2], dioxidoselenium SeO_2^{2-}, dioxidoselenato(2–)
SeO_3	SeO_3, selenium trioxide		$SeO_3^{\bullet-}$, trioxidoselenate(•1–) SeO_3^{2-}, trioxidoselenate(2–); selenite	SeO_3^{2-}, trioxidoselenato(2–); selenito
SeO_4			SeO_4^{2-}, tetraoxidoselenate(2–); selenate	SeO_4^{2-}, tetraoxidoselenato(2–); selenato
Te	tellurium >Te, tellanediyl =Te, tellanylidene; telluroxo	tellurium	telluride (general) Te$^{\bullet-}$, tellanidyl, telluride(•1–) Te^{2-}, tellanediide, telluride(2–); telluride	tellurido (general) Te$^{\bullet-}$, tellanidyl, tellurido(•1–) Te^{2-}, tellanediido, tellurido(2–)
CrO_2	CrO_2, chromium dioxide, chromium(IV) oxide			
UO_2	UO_2, uranium dioxide	UO_2^+, dioxidouranium(1+) [*not* uranyl(1+)] UO_2^{2+}, dioxidouranium(2+) [*not* uranyl(2+)]		

NpO_2	NpO_2, neptunium dioxide	NpO_2^+, dioxidoneptunium(1+) [*not* neptunyl(1+)] NpO_2^{2+}, dioxidoneptunium(2+) [*not* neptunyl(2+)]		
PuO_2	PuO_2, plutonium dioxide	PuO_2^+, dioxidoplutonium(1+) [not plutonyl(1+)] PuO_2^{2+}, dioxidoplutonium(2+) [not plutonyl (2+)]		
N	nitrogen $N^{\bullet}$, nitrogen(•), mononitrogen –N<, azanetriyl; nitrilo –N=, azanylylidene ≡N, azanylidyne	nitrogen (general) N^+, nitrogen(1+)	nitride (general) N^{3-}, nitride(3–), azanetriide; nitride $=N^-$, azanidylidene; amidylidene $–N^{2-}$, azanediidyl	N^{3-}, nitrido(3–), azanetriido
N_2	N_2, dinitrogen $=N^+=N^-$, (azanidylidene)azaniumylidene; diazo –N=N–, diazane-1,2-diylidene; hydrazinediylidene =NN=, diazene-1,2-diyl; azo	$N_2^{\bullet+}$, dinitrogen(1+) N_2^{2+}, dinitrogen(2+) $–N^+{\equiv}N$, diazyn-1-ium-1-yl	N_2^{2-}, dinitride(2–) N_2^{4-}, dinitride(4–), diazanetetraide; hydrazinetetraide	N_2, dinitrogen N_2^{2-}, dinitrido(2–) N_2^{4-}, dinitrido(4–), diazanetetraido; hydrazinetetraido
N_3	$N_3^{\bullet}$, trinitrogen(•) $–N=N^+=N^-$, azido		N_3^-, trinitride(1–); azide	N_3^-, trinitrido(1–); azido
NH	$NH^{2\bullet}$, azanylidene, hydridonitrogen(2•); nitrene >NH, azanediyl =NH, azanylidene; imino	NH^+, azanyliumdiyl, hydridonitrogen(1+) NH^{2+}, azanebis(ylium), hydridonitrogen(2+)	NH^-, azanidyl, hydridonitrate(1–) NH^{2-}, azanediide, hydridonitrate(2–); imide $–NH^-$, azanidyl; amidyl	NH^{2-}, azanediido, hydridonitrato(2–); imido
NH_2	$NH_2^{\bullet}$, azanyl, dihydridonitrogen(•); aminyl $–NH_2$, azanyl; amino	NH_2^+, azanylium, dihydridonitrogen(1+)	NH_2^-, azanide, dihydridonitrate(1–); amide	NH_2^-, azanido, dihydridonitrato(1–), amido
NH_3	NH_3, azane (parent hydride name), amine (parent name for certain organic derivatives), trihydridonitrogen; ammonia	$NH_3^{\bullet+}$, azaniumyl, trihydridonitrogen(•1+) $–NH_3^+$, azaniumyl; ammonio	$NH_3^{\bullet-}$, azanuidyl, trihydridonitrate(•1–)	NH_3, ammine
NH_4	$NH_4^{\bullet}$, λ^5-azanyl, tetrahydridonitrogen(•)	NH_4^+, azanium; ammonium		
H_2NO	$H_2NO^{\bullet}$, aminooxidanyl, dihydridooxidonitrogen(•); aminoxyl $HONH^{\bullet}$, hydroxyazanyl, hydridohydroxidonitrogen(•) –NH(OH), hydroxyazanyl, hydroxyamino $–ONH_2$, aminooxy $–NH_2(O)$, oxo-λ^5-azanyl; azinoyl		$HONH^-$, hydroxyazanide, hydridohydroxidonitrate(1–) H_2NO^-, azanolate, aminooxidanide, dihydridooxidonitrate(1–)	$NHOH^-$, hydroxyazanido, hydridohydroxidonitrato(1–) H_2NO^-, azanolato, aminooxidanido, dihydridooxidonitrato(1–)
N_2H_2	HN=NH, diazene $^-N=NH_2^+$, diazen-2-ium-1-ide $H_2NN^{2\bullet}$, diazanylidene, hydrazinylidene $=NNH_2$, diazanylidene; hydrazinylidene $^{\bullet}HNNH^{\bullet}$, diazane-1,2-diyl; hydrazine-1,2-diyl –HNNH–, diazane-1,2-diyl; hydrazine-1,2-diyl	$HNNH^{2+}$, diazynediium	$HNNH^{2-}$, diazane-1,2-diide, hydrazine-1,2-diide H_2NN^{2-}, diazane-1,1-diide, hydrazine-1,1-diide	HN=NH, diazene $^-N=NH_2^+$, diazen-2-ium-1-ido $HNNH^{2-}$, diazane-1,2-diido, hydrazine-1,2-diido H_2NN^{2-}, diazane-1,1-diido, hydrazine-1,1-diido

N_2H_3	$H_2NNH^{\bullet}$, diazanyl, trihydridodinitrogen(*N–N*)(•); hydrazinyl –$NHNH_2$, diazanyl; hydrazinyl $^{2-}NNH_3^+$, diazan-2-ium-1,1-diide	$H_2N{=}NH^+$, diazenium	H_2NNH^-, diazanide, hydrazinide	$^{2-}NNH_3^+$, diazan-2-ium-1,1-diido H_2NNH^-, diazanido, hydrazinido
N_2H_4	H_2NNH_2, diazane (parent hydride name), hydrazine (parent name for organic derivatives) $^-NHNH_3^+$, diazan-2-ium-1-ide	$H_2NNH_2^{\bullet+}$, diazaniumyl, bis(dihydridonitrogen)(*N–N*)(•1+); hydraziniumyl $H_2N{=}NH_2^{2+}$, diazenediium		H_2NNH_2, diazane, hydrazine $^-NHNH_3^+$, diazan-2-ium-1-ido
NO	NO, nitrogen mon(o)oxide (*not* nitric oxide) $NO^{\bullet}$, oxoazanyl, oxidonitrogen(•); nitrosyl –N=O, oxoazanyl; nitroso >N(O)$^-$, oxo-λ^5-azanyl; azoryl =N(O)$^-$, oxo-λ^5-azanylidene; azorylidene ≡N(O), oxo-λ^5-azanylidyne; azorylidyne $-O^+{=}N^-$, azanidylideneoxidaniumyl	NO^+, oxidonitrogen(1+) (*not* nitrosyl) $NO^{\bullet 2+}$, oxidonitrogen(2+)	NO^-, oxidonitrate(1–) $NO^{(2\bullet)-}$, oxidonitrate(2•1–)	NO, oxidonitrogen (general); nitrosyl = oxidonitrogen-κ*N* (general) NO^+, oxidonitrogen(1+) NO^-, oxidonitrato(1–)
NO_2	NO_2, nitrogen dioxide $NO_2^{\bullet}$ = $ONO^{\bullet}$, nitrosooxidanyl, dioxidonitrogen(•); nitryl –NO_2, nitro –ONO, nitrosooxy	NO_2^+, dioxidonitrogen(1+) (*not* nitryl)	NO_2^-, dioxidonitrate(1–); nitrite $NO_2^{\bullet 2-}$, dioxidonitrate(•2–)	NO_2^-, dioxidonitrato(1–); nitrito $NO_2^{\bullet 2-}$, dioxidonitrato(•2–)
NO_3	NO_3, nitrogen trioxide $NO_3^{\bullet}$ = $O_2NO^{\bullet}$, nitrooxidanyl, trioxidonitrogen(•) $ONOO^{\bullet}$, nitrosodioxidanyl, (dioxido)oxidonitrogen(•) –ONO_2, nitrooxy		NO_3^-, trioxidonitrate(1–); nitrate $NO_3^{\bullet 2-}$, trioxidonitrate(•2–) $[NO(OO)]^-$, (dioxido)oxidonitrate(1–); peroxynitrite	NO_3^-, trioxidonitrato(1–); nitrato $NO_3^{\bullet 2-}$, trioxidonitrato(•2–) $[NO(OO)]^-$, oxidoperoxidonitrato(1–); peroxynitrito
N_2O	N_2O, dinitrogen oxide (*not* nitrous oxide) NNO, oxidodinitrogen(*N—N*) –N(O)=N–, azoxy		$N_2O^{\bullet-}$, oxidodinitrate(•1–)	N_2O, dinitrogen oxide (general) NNO, oxidodinitrogen(*N—N*) $N_2O^{\bullet-}$, oxidodinitrato(•1–)
N_2O_3	N_2O_3, dinitrogen trioxide O_2NNO, trioxido-1κ^2*O*,2κ*O*-dinitrogen(*N–N*) $NO^+NO_2^-$, oxidonitrogen(1+) dioxidonitrate(1–) ONONO, dinitrosooxidane, μ-oxidobis(oxidonitrogen)		$N_2O_3^{2-}$ = $[O_2NNO]^{2-}$, trioxido-1κ$_2$*O*,2κ*O*-dinitrate(*N–N*)(2–)	
N_2O_4	N_2O_4, dinitrogen tetraoxide O_2NNO_2, bis(dioxidonitrogen)(*N–N*) ONOONO, 1,2-dinitrosodioxidane, 2,5-diazy-1,3,4,6-tetraoxy-[6]catena $NO^+NO_3^-$, oxidonitrogen(1+) trioxidonitrate(1–)			
N_2O_5	N_2O_5, dinitrogen pentaoxide O_2NONO_2, dinitrooxidane, $NO_2^+NO_3^-$, dioxidonitrogen(1+) trioxidonitrate(1–)			
NS	NS, nitrogen monosulfide $NS^{\bullet}$, sulfidonitrogen(•) –N=S, sulfanylideneazanyl; thionitroso	NS^+, sulfidonitrogen(1+) (*not* thionitrosyl)	NS^-, sulfidonitrate(1–)	NS, sulfidonitrogen, sulfidonitrato, thionitrosyl (general) NS^+, sulfidonitrogen(1+) NS^-, sulfidonitrato(1–)

P	phosphorus (general) $P^{\bullet}$, phosphorus(•), monophosphorus >P–, phosphanetriyl	phosphorus (general) P^{+}, phosphorus(1+)	phosphide (general) P^{-}, phosphide(1–) P^{3-}, phosphide(3–), phosphanetriide; phosphide	P^{3-}, phosphido, phosphanetriido
PO	$PO^{\bullet}$, oxophosphanyl, oxidophosphorus(•), phosphorus mon(o)oxide; phosphoryl >P(O)–, oxo-λ^5-phosphanetriyl; phosphoryl =P(O)–, oxo-λ^5-phosphanylidene; phosphorylidene ≡P(O), oxo-λ^5-phosphanylidyne; phosphorylidyne	PO^{+}, oxidophosphorus(1+) (*not* phosphoryl)	PO^{-}, oxidophosphate(1–)	
PO_2	–$P(O)_2$, dioxo-λ^5-phosphanyl		PO_2^{-}, dioxidophosphate(1–)	PO_2^{-}, dioxidophosphato(1–)
PO_3			PO_3^{-}, trioxidophosphate(1–) $PO_3^{\bullet 2-}$, trioxidophosphate(•2–) PO_3^{3-}, trioxidophosphate(3–); phosphite $(PO_3^{-})_n = (P(O)_2O)_n^{n-}$, *catena*-poly[(dioxidophosphate- μ-oxido)(1–)]; metaphosphate –P(O)$(O^{-})_2$, dioxidooxo-λ^5- phosphanyl; phosphonato	PO_3^{-}, trioxidophosphato(1–) $PO_3^{\bullet 2-}$, trioxidophosphato(•2–) PO_3^{3-}, trioxidophosphato(3–); phosphito
PO_4			$PO_4^{\bullet 2-}$, tetraoxidophosphate(•2–) PO_4^{3-}, tetraoxidophosphate(3–); phosphate	PO_4^{3-}, tetraoxidophosphato(3–); phosphato
PS	$PS^{\bullet}$, sulfidophosphorus(•); –PS, thiophosphoryl	PS^{+}, sulfidophosphorus(1+) (*not* thiophosphoryl)		
AsO_3			AsO_3^{3-}, trioxidoarsenate(3–); arsenite, arsorite –As(=O)$(O^{-})_2$, dioxidooxo-λ^5-arsanyl; arsonato	AsO_3^{3-}, trioxidoarsenato(3–); arsenito, arsorito
AsO_4			AsO_4^{3-}, tetraoxidoarsenate(3–); arsenate, arsorate	AsO_4^{3-}, tetraoxidoarsenato(3–); arsenato, arsorato
VO	VO, vanadium(II) oxide, vanadium mon(o)oxide	VO^{2+}, oxidovanadium(2+) (*not* vanadyl)		
CO	CO, carbon mon(o)oxide >C=O, carbonyl =C=O, carbonylidene	$CO^{\bullet +}$, oxidocarbon(•1+) CO^{2+}, oxidocarbon(2+)	$CO^{\bullet -}$, oxidocarbonate(•1–)	CO, oxidocarbon, oxidocarbonato (general); carbonyl = oxidocarbon-κ*C* (general) $CO^{\bullet +}$, oxidocarbon(•1+) $CO^{\bullet -}$, oxidocarbonato(•1–)
CO_2	CO_2, carbon dioxide, dioxidocarbon		$CO_2^{\bullet -}$, oxidooxomethyl, dioxidocarbonate(•1–)	CO_2, dioxidocarbon $CO_2^{\bullet -}$, oxidooxomethyl, dioxidocarbonato(•1–)
CO_3			$CO_3^{\bullet -}$, trioxidocarbonate(•1–), $OCOO^{\bullet -}$, (dioxido)oxidocarbonate(•1–), oxidoperoxidocarbonate(•1–) CO_3^{2-}, trioxidocarbonate(2–); carbonate	CO_3^{2-}, trioxidocarbonato(2–); carbonato
CS	carbon monosulfide >C=S, carbonothioyl; thiocarbonyl =C=S, carbonothioylidene	$CS^{\bullet +}$, sulfidocarbon(•1+)	$CS^{\bullet -}$, sulfidocarbonate(•1–)	CS, sulfidocarbon, sulfidocarbonato, thiocarbonyl (general); $CS^{\bullet +}$, sulfidocarbon(•1+) $CS^{\bullet -}$, sulfidocarbonato(•1–)
CS_2	CS_2, disulfidocarbon, carbon disulfide		$CS_2^{\bullet -}$, sulfidothioxomethyl, disulfidocarbonate(•1–)	CS_2, disulfidocarbon $CS_2^{\bullet -}$, sulfidothioxomethyl, disulfidocarbonato(•1–)

CN	$CN^{\bullet}$, nitridocarbon(•); cyanyl –CN, cyano –NC, isocyano	CN^{+}, azanylidynemethylium, nitridocarbon(1+)	CN^{-}, nitridocarbonate(1–); cyanide	nitridocarbonato (general) CN^{-}, nitridocarbonato(1–); cyanido = [nitridocarbonato(1–)-κ*C*]
CNO	$OCN^{\bullet}$, nitridooxidocarbon(•) –OCN, cyanato –NCO, isocyanato –ONC, λ^2-methylidene ⌒ azanylylideneoxy –CNO, (oxo-λ^5-azanylidynemethyl		OCN^{-}, nitridooxidocarbonate(1–); cyanate ONC^{-}, carbidooxidonitrate(1–); fulminate $OCN^{\bullet 2-}$, nitridooxidocarbonate(•2–)	OCN^{-}, nitridooxidocarbonato(1–); cyanato ONC^{-}, carbidooxidonitrato(1–); fulminato
CNS	$SCN^{\bullet}$, nitridosulfidocarbon(•) –SCN, thiocyanato –NCS, isothiocyanato –SNC, λ^2-methylidene ⌒ azanylylidenesulfanediyl –CNS, (sulfanylidene-λ^5-azanylidynemethyl		SCN^{-}, nitridosulfidocarbonate(1–); thiocyanate SNC^{-}, carbidosulfidonitrate(1–)	SCN^{-}, nitridosulfidocarbonato(1–); thiocyanato SNC^{-}, carbidosulfidonitrato(1–)
CNSe	$SeCN^{\bullet}$, nitridoselenidocarbon(•) –SeCN, selenocyanato –NCSe, isoselenocyanato –SeNC, λ^2-methylidene ⌒ azanylylideneselanediyl –CNSe, (selanylidene-λ^5-azanylidynemethyl		$SeCN^{-}$, nitridoselenidocarbonate(1–); selenocyanate $SeNC^{-}$, carbidoselenidonitrate(1–)	$SeCN^{-}$, nitridoselenidocarbonato(1–); selenocyanato $SeNC^{-}$, carbidoselenidonitrato(1–)

[a] Where an element symbol occurs in the first column, the unmodified element name is listed in the second and third columns. The unmodified name is generally used when the element appears as an electropositive constituent in the construction of a stoichiometric name (Sections IR-5.2 and IR-5.4). Names of homoatomic cations consisting of the element are also constructed using the element name, adding multiplicative prefixes and charge numbers as applicable (Sections IR-5.3.2.1 to IR-5.3.2.3). The sections mentioned refer to parts of Nomenclature of Inorganic Chemistry. IUPAC Recommendations 2005, see above.

[b] Where an element symbol occurs in the first column, the fourth column gives the element name appropriately modified with the ending 'ide' (hydride, nitride, etc.). The 'ide' form of the element name is generally used when the element appears as an electronegative constituent in the construction of a stoichiometric name (Sections IR-5.2 and IR-5.4). Names of homoatomic anions consisting of the element in question are also constructed using this modified form, adding multiplicative prefixes and charge numbers as applicable (Sections IR-5.3.3.1 to IR-5.3.3.3). Examples are given in the Table of names of some specific anions, e.g. chloride(1–), oxide(2–), dioxide(2–). In certain cases, a particular anion has the 'ide' form itself as an accepted short name, e.g. chloride, oxide. If specific anions are named, the 'ide' form of the element name with no further modification is given as the first entry in the fourth column, with the qualifier '(general)'. The sections mentioned refer to parts of Nomenclature of Inorganic Chemistry. IUPAC Recommendations 2005, see above.

[c] Ligand names must be placed within enclosing marks whenever necessary to avoid ambiguity, cf. Section IR-9.2.2.3. Some ligand names must always be enclosed. For example, if 'dioxido' is cited as is, it must be enclosed so as to distinguish it from two 'oxido' ligands; if combined with a multiplicative prefix it must be enclosed because it starts with a multiplicative prefix itself. A ligand name such as 'nitridocarbonato' must always be enclosed to avoid interpreting it as two separate ligand names, 'nitrido' and 'carbonato'. In this table, however, these enclosing marks are omitted for the sake of clarity. Note that the ligand names given here with a charge number can generally also be used without if it is not desired to make any implication regarding the charge of the ligand. For example, the ligand name '[dioxido(•1–)]' may be used if one wishes explicitly to consider the ligand to be the species dioxide(•1–), whereas the ligand name '(dioxido)' can be used if no such implications are desirable. The section mentioned refer to parts of Nomenclature of Inorganic Chemistry. IUPAC Recommendations 2005, see above.

ORGANIC SUBSTITUENT GROUPS AND RING SYSTEMS

The first part of this table lists substituent groups and their line formulas. A substituent group is defined by IUPAC as a group that replaces one or more hydrogen atoms attached to a parent structure. Such groups are sometimes called radicals, but IUPAC now reserves the term radical for a free molecular species with unpaired electrons. IUPAC does not recommend some of these names, which are marked here with asterisks (e.g., amyl*), but they are included in this list because they are often encountered in the older literature. Substituent group names which are formed by systematic rules (e.g., methyl from methane, ethyl from ethane, etc.) are included here only for the first few members of a homologous series.

In the second part of the table a number of common organic ring compounds are shown, with the conventional numbering of the ring positions indicated.

The help of Warren H. Powell in preparing this table is greatly appreciated. Pertinent references may be found in the table "Nomenclature of Chemical Compounds."

Substituent Groups

acetamido (acetylamino)	CH_3CONH-
acetoacetyl	CH_3COCH_2CO-
acetonyl	CH_3COCH_2-
acetyl	CH_3CO-
acryloyl* (1-oxo-2-propenyl)	CH_2=CHCO-
alanyl (from alanine)	$CH_3CH(NH_2)CO$-
β-alanyl	$H_2N(CH_2)_2CO$-
allyl (2-propenyl)	CH_2=$CHCH_2$-
allylidene (2-propenylidene)	CH_2=CHCH=
amidino (aminoiminomethyl)	$H_2NC(=NH)$-
amino	H_2N-
amyl* (pentyl)	$CH_3(CH_2)_4$-
anilino (phenylamino)	C_6H_5NH-
anisidino	$CH_3OC_6H_4NH$-
anthranoyl (2-aminobenzoyl)	2-$H_2NC_6H_4CO$-
arsino	AsH_2-
azelaoyl (from azelaic acid)	-$OC(CH_2)_7CO$-
azido	N_3-
azino	=N-N=
azo	-N=N-
azoxy	-N(O)=N-
benzal* (benzylidene)	C_6H_5CH=
benzamido (benzoylamino)	C_6H_5CONH-
benzhydryl (diphenylmethyl)	$(C_6H_5)_2CH$-
benzoxy* (benzoyloxy)	C_6H_5COO-
benzoyl	C_6H_5CO-
benzyl	$C_6H_5CH_2$-
benzylidene	C_6H_5CH=
benzylidyne	C_6H_5C≡
biphenylyl	$C_6H_5C_6H_5$-
biphenylene	-C_6H_4-C_6H_4-
butoxy	C_4H_9O-
sec-butoxy (1-methylpropoxy)	$C_2H_5CH(CH_3)O$-
tert-butoxy (1,1-dimethylethoxy)	$(CH_3)_3CO$-
butyl	$CH_3(CH_2)_3$-
sec-butyl (1-methylpropyl)	$CH_3CH_2CH(CH_3)$-
tert-butyl (1,1-dimethylethyl)	$(CH_3)_3C$-
butyryl (1-oxobutyl)	$CH_3(CH_2)_2CO$-
caproyl* (hexanoyl)	$CH_3(CH_2)_4CO$-
capryl* (decanoyl)	$CH_3(CH_2)_8CO$-
capryloyl* (octanoyl)	$CH_3(CH_2)_6CO$-
carbamido (carbamoylamino)	H_2NCONH-
carbamoyl (aminocarbonyl)	H_2NCO-
carbamyl (aminocarbonyl)	H_2NCO-
carbazoyl (hydrazinocarbonyl)	H_2NNHCO-
carbethoxy (ethoxycarbonyl)	C_2H_5OCO-
carbonyl	=C=O
carboxy	HOOC-
cetyl* (hexadecyl)	$CH_3(CH_2)_{15}$-
chloroformyl (chlorcarbonyl)	$ClCO$-
cinnamoyl	C_6H_5CH=CHCO-
cinnamyl (3-phenyl-2-propenyl)	C_6H_5CH=$CHCH_2$-
cinnamylidene	C_6H_5CH=CHCH=
cresyl* (hydroxymethylphenyl)	$HO(CH_3)C_6H_4$-
crotonoyl	CH_3CH=CHCO-
crotyl (2-butenyl)	CH_3CH=$CHCH_2$-
cyanamido (cyanoamino)	NCNH-
cyanato	NCO-
cyano	NC-
decanedioyl	-$OC(CH_2)_8CO$-
decanoyl	$CH_3(CH_2)_8CO$-
diazo	N_2=
diazoamino	-NHN=N-
disilanyl	H_3SiSiH_2-
disiloxanyloxy	$H_3SiOSiH_2O$-
disulfinyl	-S(O)S(O)-
dithio	-SS-
enanthoyl* (heptanoyl)	$CH_3(CH_2)_5CO$-
epoxy	-O-
ethenyl (vinyl)	CH_2=CH-
ethynyl	HC≡C-
ethoxy	C_2H_5O-
ethyl	CH_3CH_2-
ethylene	-CH_2CH_2-
ethylidene	CH_3CH=
ethylthio	C_2H_5S-
formamido (formylamino)	HCONH-
formyl	HCO-
furmaroyl (from fumaric acid)	-OCCH=CHCO-
furfuryl (2-furanylmethyl)	$OC_4H_3CH_2$-
furfurylidene (2-furanylmethylene)	OC_4H_3CH=
glutamoyl (from glutamic acid)	-$OC(CH_2)_2CH(NH_2)CO$-
glutaryl (from glutaric acid)	-$OC(CH_2)_3CO$-
glycylamino	H_2NCH_2CONH-
glycoloyl; glycolyl (hydroxyacetyl)	$HOCH_2CO$-
glycyl (aminoacetyl)	H_2NCH_2CO-
glyoxyloyl; glyoxylyl (oxoacetyl)	HCOCO-
guanidino	$H_2NC(=NH)NH$-
guanyl (aminoiminomethyl)	$H_2NC(=NH)$-
heptadecanoyl	$CH_3(CH_2)_{15}CO$-
heptanamido	$CH_3(CH_2)_5CONH$-
heptanedioyl	-$OC(CH_2)_5CO$-
heptanoyl	$CH_3(CH_2)_5CO$-
hexadecanoyl	$CH_3(CH_2)_{14}CO$-
hexamethylene (1,6-hexanediyl)	-$(CH_2)_6$-
hexanedioyl	-$OC(CH_2)_4CO$-
hippuryl (N-benzoylglycyl)	$C_6H_5CONHCH_2CO$-
hydrazino	H_2NNH-
hydrazo	-HNNH-
hydrocinnamoyl	$C_6H_5(CH_2)_2CO$-

hydroperoxy	HOO-
hydroxyamino	HONH-
hydroxy	HO-
imino	HN=
iodoso* (iodosyl)	OI-
iodyl	O_2I-
isoamyl* (isopentyl; 3-methylbutyl)	$(CH_3)_2CH(CH_2)_2$-
isobutenyl (2-methyl-1-propenyl)	$(CH_3)_2C$=CH-
isobutoxy (2-methylpropoxy)	$(CH_3)_2CHCH_2O$-
isobutyl (2-methylpropyl)	$(CH_3)_2CHCH_2$-
isobutylidene (3-methylpropylidene)	$(CH_3)_2CHCH$=
isobutyryl (2-methyl-1-oxopropyl)	$(CH_3)_2CHCO$-
isocyanato	OCN-
isocyano	CN-
isohexyl (4-methylpentyl)	$(CH_3)_2CH(CH_2)_3$-
isoleucyl (from isoleucine)	$C_2H_5CH(CH_3)CH(NH_2)CO$-
isonitroso* (hydroxyamino)	HON=
isopentyl (3-methylbutyl)	$(CH_3)_2CH(CH_2)_2$-
isopentylidene (3-methylbutylidene)	$(CH_3)_2CHCH_2CH$=
isopropenyl (1-methylethenyl)	$CH_2=C(CH_3)$-
isopropoxy (1-methylethoxy)	$(CH_3)_2CHO$-
isopropyl (1-methylethyl)	$(CH_3)_2CH$-
isopropylidene (1-methylethylidene)	$(CH_3)_2C$=
isothiocyanato (isothiocyano)	SCN-
isovaleryl* (3-methyl-1-oxobutyl)	$(CH_3)_2CHCH_2CO$-
lactoyl (from lactic acid)	$CH_3CH(OH)CO$-
lauroyl (from lauric acid)	$CH_3(CH_2)_{10}CO$-
lauryl (dodecyl)	$CH_3(CH_2)_{11}$-
leucyl (from leucine)	$(CH_3)_2CHCH_2CH(NH_2)CO$-
levulinoyl (from levulinic acid)	$CH_3CO(CH_2)_2CO$-
malonyl (from malonic acid)	$-OCCH_2CO$-
mandeloyl (from mandelic acid)	$C_6H_5CH(OH)CO$-
mercapto	HS-
mesityl	$2,4,6-(CH_3)_3C_6H_2$-
methacryloyl (from methacrylic acid)	$CH_2=C(CH_3)CO$-
methallyl (2-methyl-2-propenyl)	$CH_2=C(CH_3)CH_2$-
methionyl (from methionine)	$CH_3SCH_2CH_2CH(NH_2)CO$-
methoxy	CH_3O-
methyl	H_3C-
methylene	H_2C=
methylthio	CH_3S-
myristoyl (from myristic acid)	$CH_3(CH_2)_{12}CO$-
myristyl (tetradecyl)	$CH_3(CH_2)_{13}$-
naphthyl	$(C_{10}H_7)$-
naphthylene	$-(C_{10}H_6)$-
neopentyl (2,2-dimethylpropyl)	$(CH_3)_3CCH_2$-
nitramino (nitroamino)	O_2NNH-
nitro	O_2N-
nitrosamino (nitrosoamino)	ONNH-
nitrosimino (nitrosoimino)	ONN=
nitroso	ON-
nonanoyl (from nonanoic acid)	$CH_3(CH_2)_7CO$-
oleoyl (from oleic acid)	$CH_3(CH_2)_7CH=CH(CH_2)_7CO$-
oxalyl (from oxalic acid)	-OCCO-
oxo	O=
palmitoyl (from palmitic acid)	$CH_3(CH_2)_{14}CO$-
pentamethylene (1,5-pentanediyl)	$-(CH_2)_5$-
pentyl	$CH_3(CH_2)_4$-
tert-pentyl	$CH_3CH_2C(CH_3)_2$-
phenacyl	$C_6H_5COCH_2$-
phenacylidene	C_6H_5COCH=
phenethyl (2-phenylethyl)	$C_6H_5CH_2CH_2$-
phenoxy	C_6H_5O-
phenyl	C_6H_5-
phenylene (benzenediyl)	$-C_6H_4$-
phosphino* (phosphanyl)	H_2P-
phosphinyl* (phosphinoyl)	$H_2P(O)$-
phospho	O_2P-
phosphono	$(HO)_2P(O)$-
phthaloyl (from phthalic acid)	$1,2-C_6H_4(CO-)_2$
picryl (2,4,6-trinitrophenyl)	$2,4,6-(NO_2)_3C_6H_2$-
pimeloyl (from pimelic acid)	$-OC(CH_2)_5CO$-
piperidino (1-piperidinyl)	$C_5H_{10}N$-
pivaloyl (from pivalic acid)	$(CH_3)_3CCO$-
prenyl (3-methyl-2-butenyl)	$(CH_3)_2C=CHCH_2$-
propargyl (2-propynyl)	$HC\acute{}CCH_2$-
1-propenyl	$-CH=CHCH_2$
2-propenyl (allyl)	$CH_2=CHCH_2$-
propionyl* (propanyl)	CH_3CH_2CO-
propoxy	$CH_3CH_2CH_2O$-
propyl	$CH_3CH_2CH_2$-
propylidene	CH_3CH_2CH=
pyrryl (pyrrolyl)	C_3H_4N-
salicyloyl (2-hydroxybenzoyl)	$2-HOC_6H_4CO$-
selenyl* (selanyl; hydroseleno)	HSe-
seryl (from serine)	$HOCH_2CH(NH_2)CO$-
siloxy	H_3SiO-
silyl	H_3Si-
silylene	H_2Si=
sorboyl (from sorbic acid)	$CH_3CH=CHCH=CHCO$-
stearoyl (from stearic acid)	$CH_3(CH_2)_{14}CO$-
stearyl (octadecyl)	$CH_3(CH_2)_{17}$-
styryl (2-phenylethenyl)	$C_6H_5CH=CH$-
suberoyl (from suberic acid)	$-OC(CH_2)_6CO$-
succinyl (from succinic acid)	$-OCCH_2CH_2CO$-
sulfamino (sulfoamino)	$HOSO_2NH$-
sulfamoyl (sulfamyl)	H_2NSO_2-
sulfanilyl [(4-aminophenyl)sulfonyl]	$4-H_2NC_6H_4SO_2$-
sulfeno	HOS-
sulfhydryl (mercapto)	HS-
sulfinyl	OS=
sulfo	HO_3S-
sulfonyl (sulfuryl)	$-SO_2$-
terephthaloyl	$1,4-C_6H_4(CO-)_2$
tetramethylene	$-(CH_2)_4$-
thienyl (from thiophene)	(C_4H_3S)-
thiocarbonyl (carbothionyl)	=CS
thiocarboxy	HOSC-
thiocyanato (thiocyano)	NCS-
thionyl* (sulfinyl)	-SO-
threonyl (from threonine)	$CH_3CH(OH)CH(NH_2)CO$-
toluidino [(methylphenyl)amino]	$CH_3C_6H_4NH$-
toluoyl (methylbenzoyl)	$CH_3C_6H_4CO$-
tolyl (methylphenyl)	$CH_3C_6H_4$-
α-tolyl (benzyl)	$C_6H_5CH_2$-
tolylene (methylphenylene)	$-(CH_3C_6H_3)$-
tosyl [(4-methylphenyl) sulfonyl)]	$4-CH_3C_6H_4SO_2$-
triazano	H_2NNHNH-
trimethylene (1,3-propanediyl)	$-(CH_2)_3$-
trityl (triphenylmethyl)	$(C_6H_5)_3C$-
valeryl* (pentanoyl)	$CH_3(CH_2)_3CO$-
valyl (from valine)	$(CH_3)_2CHCH(NH_2)CO$-
vinyl (ethenyl)	$CH_2=CH$-
vinylidene (ethenylidene)	$CH_2=C$=
xylidino [(dimethylphenyl)amino]	$(CH_3)_2C_6H_3NH$-
xylyl (dimethylphenyl)	$(CH_3)_2C_6H_3$-
xylylene [phenelenebis(methylene)]	$-CH_2C_6H_4CH_2$-

Organic Ring Compounds


Cyclopropane

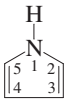

Spiropentane


Cyclobutane

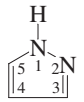

Cyclopentane


Furan


Thiophene

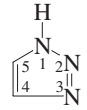

Pyrrole (Azole)

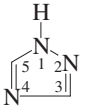

2*H*-Pyrrole (2*H*-Azole)


Pyrazole (1,2-Diazole)


3*H*-Pyrrole (3*H*-Azole)


2*H*-Imidazole (1,3-Diazole)


1,2,3-Triazole


1,2,4-Triazole


1,2-Dithiole


1,3-Dithiole


3*H*-1,2-Oxathiole


Isoxazole (1,2-Oxazole)


Thiazole (1,3-Thiazole)


Oxazole (1,3-Oxazole)


Isothiazole (1,2-Thiazole)


1,2,3-Oxadiazole

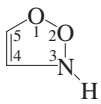

1,2,4-Oxadiazole


1,2,5-Oxadiazole (Furazan)

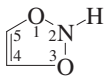

1,3,4-Oxadiazole


1,2,3,4-Oxatriazole

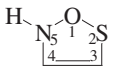

1,2,3,5-Oxatriazole


3*H*-1,2,3-Dioxazole


1,2,4-Dioxazole


1,3,2-Dioxazole


1,3,4-Dioxazole


5*H*-1,2,5-Oxathiazole

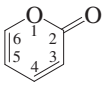

1,3-Oxathiole

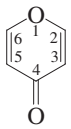

Benzene


Cyclohexane


2*H*-Pyran


4*H*-Pyran


2*H*-Pyran-2-one (2-Pyrone)


4*H*-Pyran-4-one (4-Pyrone)


1,2-Dioxin


1,3-Dioxin

Pyridine

Pyridazine

Pyrimidine

Pyrazine

Piperazine

1,3,5-Triazine (*s*-Triazine)

1,2,4-Triazine (*as*-Triazine)

1,2,3-Triazine (*v*-Triazine)

4*H*-1,2-Oxazine

2*H*-1,3-Oxazine

6*H*-1,3-Oxazine

6*H*-1,2-Oxazine

1,4-Oxazine

2*H*-1,2-Oxazine

4*H*-1,4-Oxazine

1,2,5-Oxathiazine

1,2,6-Oxathiazine

1,2,4-Oxadiazine

1,3,5-Oxadiazine

Morpholine

Azepine

Oxepin

Thiepin

4*H*-1,2-Diazepine

Indene

2*H*-Indene (Isoindene)

Benzofuran

Isobenzofuran

Benzo[b]thiophene

Benzo[c]thiophene

Indole

3*H*-Indole

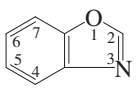
1*H*-Indole

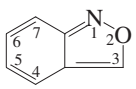
Cyclopenta[b]pyridine

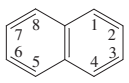
Pyrano[3,4-b]-pyrrole

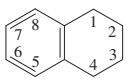
Indazole

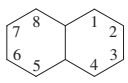
Benzisoxazole (Indoxazene)

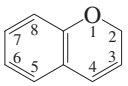

Benzoxazole

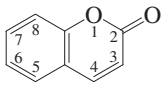

2,1-Benzisoxazole

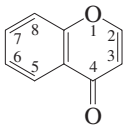

Naphthalene

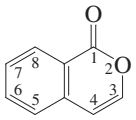

1,2,3,4-Tetrahydronaphthalene (Tetralin)

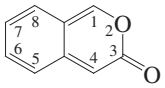

Octahydronaphthalene (Decalin)

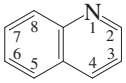

2*H*-1-Benzopyran (2*H*-Chromene)

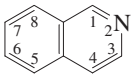

2*H*-1-Benzopyran-2-one (Coumarin)

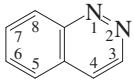

4H-1-Benzopyran-4-one (Chromen-4-one)

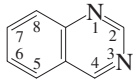

1*H*-2-Benzopyran-1-one (Isocoumarin)

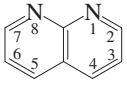

3*H*-2-Benzopyran-1-one (Isochromen-3-one)

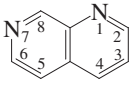

Quinoline

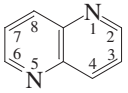

Isoquinoline

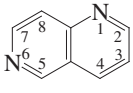

Cinnoline

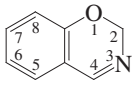

Quinazoline

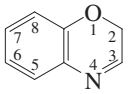

1,8-Naphthyridine

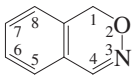

1,7-Naphthyridine

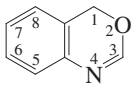

1,5-Naphthyridine

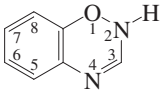

1,6-Naphthyridine

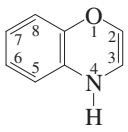

2*H*-1,3-Benzoxazine

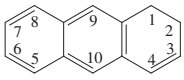

2*H*-1,4-Benzoxazine

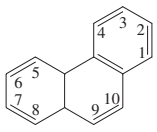

1*H*-2,3-Benzoxazine

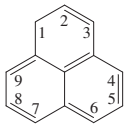

4*H*-3,1-Benzoxazine

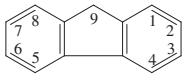

2*H*-1,2-Benzoxazine

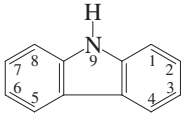

4H-1,4-Benzoxazine

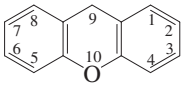

Anthracene

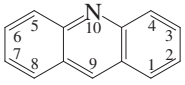

Phenanthrene


Phenalene

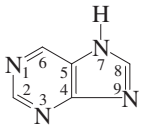

Fluorene

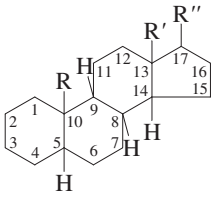

Carbazole


Xanthene


Acridine


Norpinane (Bicyclo[3.1.1]heptane)


7*H*-Purine


Steroid ring system

R = Nearly always methyl
R′ = Usually methyl
R″ = Various groups

SCIENTIFIC ABBREVIATIONS AND SYMBOLS

This table lists some abbreviations, acronyms, and symbols encountered in the physical sciences. Most entries in italic type are symbols for physical quantities; for more details on these, see the table "Symbols and Terminology for Physical and Chemical Quantities" in this section. Additional information on units may be found in the table "International System of Units" in Section 1. Many of the terms to which these abbreviations refer are included in the tables "Definitions of Scientific Terms" in Section 2 and "Techniques for Materials Characterization" in Section 12. Useful references for further information are given below.

Publication practices vary with regard to the use of capital or lower case letters for many abbreviations. An effort has been made to follow the most common practices in this table, but much variation is found in the literature. Likewise, policies on the use of periods in an abbreviation vary considerably. Periods are generally omitted in this table unless they are necessary for clarity. Periods should never appear in SI units. The SI prefixes (m, k, M, etc.) are included here, but they should never be used alone. Selected combinations of these prefixes with SI units (e.g., mg, kV, MW) are also included.

Abbreviations are listed in alphabetical order without regard to case. Entries beginning with Greek letters fall at the end of the table.

References

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2. Kotyk, A., *Quantities, Symbols, Units, and Abbreviations in the Life Sciences*, Humana Press, Totawa, NJ, 1999.
3. Rhodes, P. H., *The Organic Chemist's Desk Reference*, Chapman & Hall, London, 1995.
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5. Brown, R. D., Ed., Acronyms Used in Theoretical Chemistry, *Pure Appl. Chem*. 68, 387-456, 1996.
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7. Cohen, E. R., and Giacomo, P., Symbols, Units, Nomenclature, and Fundamental Constants in Physics, *Physica* 146A, 1-68, 1987.
8. *Chemical Acronyms Database*, Indiana University, < www.oscar.chem.indiana.edu/cfdocs/ libchem/acronyms/ acronymsearch.html>.
9. *Acronyms and Symbols*, <www3.interscience.wiley.com/stasa/>.

A	ampere; adenine (in genetic code)
Å	ångström
A	absorbance; area; Helmholtz energy; mass number
A_H	Hall coefficient
A_r	atomic weight (relative atomic mass)
a	atto (SI prefix for 10^{-18})
a	absorption coefficient; acceleration; activity; van der Waals constant
a_0	Bohr radius
A/D	analog to digital
AAA	acetoacetanilide
AAO	acetaldehyde oxime
AAS	atomic absorption spectroscopy
ABA	abscisic acid
Abe	abequose
ABL	α-acetylbutyrolactone
abs	absolute
Ac	acetyl; acetate
ac, AC	alternating current
Aces	2-[(2-amino-2-oxoethyl)amino]ethanesulfonic acid
ACT	activated complex theory
ACTH	adrenocorticotropic hormone
Ad	adamantyl
Ada	[(carbamoylmethyl)imino]diacetic acid
Ade	adenine
Ado	adenosine
ADP	adenosine diphosphate
ads	adsorption
ae	eon (10^9 years)
AEP	1-(2-aminoethyl)piperazine
AES	atomic emission spectroscopy; Auger electron spectroscopy
AF	audio frequency
AFM	atomic force microscopy
AI	artificial intelligence
AIBN	2,2'-azobis[isobutyronitrile]
AICA	5-amino-1*H*-imidazole-4-carboxamide
AIM	atoms in molecules (method)
AIP	aluminum isopropoxide
Al	Alfén number
Ala	alanine
alc	alcohol
ALE	atomic layer epitaxy
aliph.	aliphatic
alk.	alkaline
All	allose
Alt	altrose
AM	amplitude modulation
Am	Amyl
am	amorphous solid
AMP	adenosine monophosphate
AMPD	2-amino-2-methyl-1,3-propanediol
AMTCS	amyltrichlorosilane [trichloropentylsilane]
amu	atomic mass unit (recommended symbol is u)
AN	acetonitrile
anh, anhyd	anhydrous
ANOVA	analysis of variance
antilog	antilogarithm
ANTU	1-naphthalenylthiourea
AO	atomic orbital
AOM	angular overlap model
APAD	3-acetylpyridine adenine dinucleotide
Api	apiose
APM	atomic probe microanalysis
APS	appearance potential spectroscopy; adenosine phosphosulfate
APW	augmented plane wave
aq	aqueous
Ar	aryl
Ara	arabinose
Ara-ol	arabinitol
Arg	arginine

ARPES	angular resolved photoelectron spectroscopy
ASC	4-(acetylamino)benzenesulfonyl chloride
ASCII	American National Standard Code for Information Interchange
ASE	aromatic stabilization model
Asn	asparagine
Asp	aspartic acid
at	atomization
ATEE	*N*-acetyl-*L*-tyrosine ethyl ester
ATLC	adsorption thin layer chromatography
atm	standard atmosphere
ATP	adenosine triphosphate
ATR	attenuated total internal reflection
at.wt.	atomic weight
AU	astronomical unit (ua is also used)
av	average
avdp	avoirdupois
B	bel
B	magnetic flux density; second virial coefficient; susceptance
b	barn
b	van der Waals constant; molality
BA	benzyladenine
BAL	British anti-Lewisite [2,3-dimercapto-1-propanol]
BAP, BaP	benzo[a]pyrene
bar	bar (pressure unit)
bbl	barrel
BBP	benzyl butyl phthalate
BCB	bromocresol blue
bcc	body centered cubic
BCG	bromocresol green
BCNU	*N*,*N*′-bis(2-chloroethyl)-*N*-nitrosourea
BCP	bromocresol purple
BCPB	bromochlorophenol blue
BCS	Bardeen-Cooper-Schrieffer (theory)
BDE	bond dissociation energy
BDEA	butyldiethanolamime
BDMA	benzyldimethylamine
Bé	Baumé
BEBO	bond energy bond order (method)
BEI	biological exposure index
Bes	2-[bis(2-hydroxyethyl)amino]ethanesulfonic acid
BET	Brunauer-Emmett-Teller (isotherm)
BeV	billion electronvolt (GeV)
BGE	butyl glycidyl ether
BHA	*tert*-butyl-4-hydroxyanisole
BHC	benzene hexachloride [hexachlorobenzene]
Bhn	Brinell hardness number
BHT	butylated hydroxytoluene [2,6-di-*tert*-butyl-4-methylphenol]
Bi	biot
Bicine	*N*,*N*-bis(2-hydroxyethyl)glycine
Bistris	2-[bis(2-hydroxyethyl)amino]-2-(hydroxymethyl)propane-1,3-diol
Bistris-propane	1,3-bis[tris(hydroxymethyl)methylamino]propane
BLO	γ-butyrolactone
BN	bond number; benzonitrile
BNS	nuclear backscattering spectroscopy
BO	Born-Oppenheimer (approximation); bond order
BOD	biochemical oxygen demand
BON	β-hydroxynaphthoic acid
bp	boiling point
BPB	bromophenol blue
BPG	2,3-bis(phospho)-*D*-glycerate
bpy	2,2′-bipyridine
Bq	becquerel
Br	butyryl
BRE	bond resonance energy
BrUrd	5-bromouridine
BSSE	basis set superposition error
BTMSA	1,2-bis(trimethylsilyl)acetylene
Btu	British thermal unit
BTX	benzene, toluene, and xylene
Bu	butyl
bu	bushel
Bz	benzoyl
Bzl	benzyl
C	coulomb; cytosine (in genetic code)
°C	degree Celsius
C	capacitance; heat capacity; number concentration
c	centi (SI prefix for 10^{-2}); combustion reaction
c	amount concentration; specific heat; velocity
c_0	speed of light in vacuum
ca.	approximately
cal	calorie
calc	calculated
cAMP	adenosine cyclic 3′,5′-(hydrogen phosphate)
CAN	ceric ammonium nitrate
CARS	coherent anti-Stokes Raman spectroscopy
CAS	complete active space
CASRN	Chemical Abstracts Service Registry Number
CAT	computerized axial tomography; clear air turbulence
CBE	chemical beam epitaxy
CBS	complete basis set (of orbitals)
CC	coupled cluster
cc	cubic centimeter (mL)
CCD	charge-coupled device
CD	circular dichroism
cd	candela; condensed (phase)
CDNO	complete neglect of differential overlap
CDP	cytidine 5′-diphosphate
CDT	1,5,9-cyclododecatriene
CDTA	(1,2-cyclohexylenedinitrilo)tetraacetic acid monohydrate
CDW	charge density waves
CEP	counter electrophoresis
CEPA	coupled electron-pair approximation
cf.	compare
cfm	cubic feet per minute
cgs	centimeter-gram-second system
Chaps	3-[3-(cholamidopropyl)dimethylammonio]-1-propanesulfonic acid
Ches	2-(*N*-cyclohexylamino)ethanesulfonic acid
CHF	coupled Hartree-Fock (method)
Chl	chlorophyll
Cho	choline
CHT	1,3,5-cycloheptatriene
Ci	curie
CI	configuration interaction; chemical ionization, color index
CIDEP	chemically induced dynamic electron polarization
CIDNP	chemically induced dynamic nuclear polarization
CIE	countercurrent immunoelectrophoresis
cir	circular
CKFF	Cotton-Kraihanzel force field

CL	cathode luminescence (spectroscopy)
cm	centimeter
c.m.	center of mass
c.m.c.	critical micelle concentration
CMO	canonical molecular orbital
CMP	cytidine 5'-monophosphate
CN	coordination number
CNDO	complete neglect of differential overlap
Co	Cowling number
COD	chemical oxygen demand; 1,4-cyclooctadiene
conc	concentrated; concentration
const	constant
COOP	crystal orbital overlap population
cos	cosine
cosh	hyperbolic cosine
COSY	correlation spectroscopy
COT	1,3,5,7-cyclooctatetraene
cot	cotangent
coth	hyperbolic cotangent
CP	chemically pure
Cp	cyclopentadienyl
cP	centipoise
cp	candle power
CPA	coherent potential approximation
CPC	centrifugal partition chromatography
cpd	contact potential difference
CPR	chlorophenol red
cps	cycles per second
CPT	charge conjugation/space inversion/time inversion (theorem)
CPU	central processing unit
cr, cryst	crystalline (phase)
CRU	constitutional repeating unit (in polymer nomenclature)
CSA	camphorsulfonic acid
csc	cosecant
CT	charge transfer
ct	carat
CTEM	conventional transmission electron microscopy
CTP	cytidine 5'-triphosphate
CTR	controlled thermonuclear reaction
cu	cubic
CV	cyclic voltammetry
CVD	chemical vapor deposition
cw	continuous wave
cwt	hundredweight (112 pounds)
Cy	cyclohexyl
Cyd	cytidine
cyl	cylinder
Cys	cysteine
Cyt	cytosine
D	debye unit
D	diffusion coefficient; dissociation energy; electric displacement
d	day; deuteron; deci (SI prefix for 10^{-1})
d	distance; density; dextrorotatory
2,4-D	2,4-dichlorophenoxyacetic acid
D/A	digital to analog
Da	dalton
DA	donor-acceptor (complex)
da	deka (SI prefix for 10^{1})
DAA	diacetone alcohol
DAB	4-(dimethylamino)azobenzene
DACH	*trans*-1,2-diaminocyclohexane
DAP	diammonium phosphate
dB	decibel
DBA	dibenz[a,h]anthracene
DBCP	1,2-dibromo-3-chloropropane
DBMS	database management system
DBP	dibutyl phthalate
DBPC	2,6-di-*tert*-butyl-*p*-cresol
dc, DC	direct current
DCB	dicyanobenzene
DCEE	dichloroethyl ether
DCHA	dicyclohexylamine
DCM	dichloromethane
DCPD	dicyclopentadiene
DE	delocalization energy
Dec	decyl
dec	decomposes
DEET	diethyltoluamide [*N,N*-diethyl-3-methylbenzamide]
deg	degree
den	density
det	determinant
dev	deviation
DFT	density functional theory
dGlc	2-deoxyglucose
DHU	dihydrouridine
diam	diameter
dil	dilute; dilution
DIM	diatomics in molecules (method); digital imaging microscopy
dm	decimeter
DMA	*N,N*-dimethylaniline
DMAC	*N,N*-dimethylacetamide
DMF	*N,N*-dimethylformamide
DMP	dimethyl phthalate
DMS	dimethyl sulfide
DMSO	dimethyl sulfoxide
DMT	dimethyl terephthalate; dimethyl tartrate
DNA	deoxyribonucleic acid
DNase	deoxyribonuclease
DNMR	dynamic NMR spectroscopy
DNP	dinitropyrene
Dod	dodecyl
DOP	dioctyl phthalate
DOS	density of states; digital operating system
doz	dozen
d.p.	degree of polymerization
dpl	displacement
dpm	disintegrations per minute
dps	disintegrations per second
dr	dram
DRE	Dewar resonance energy
dRib	2-deoxyribose
DRIFT	diffuse reflectance infrared Fourier transform
DRP	dynamic reaction path
DRS	diffuse reflectance spectroscopy
DSC	differential scanning calorimetry
DTA	differential thermal analysis
DTBP	di-*tert*-butyl peroxide
DVB	divinylbenzene
dyn	dyne
DZ	double-zeta (type of basis set)
E	exa (SI prefix for 10^{18})

E	electric field strength; electromotive force; energy; modulus of elasticity; entgegen (*trans* configuration)
E_h	Hartree energy
e	electron; base of natural logarithms
e	elementary charge; linear strain
EA	electron affinity
EAN	effective atomic number
ECP	effective core potential
ECR	electron cyclotron resonance
ED	electron diffraction
EDAX	energy dispersive analysis by x-rays
EDB	ethylene dibromide [1,2-dibromoethane]
EDC	ethylene dichloride [1,2-dichloroethane]
EDS	energy-dispersive x-ray spectroscopy
EDTA	ethylenediaminetetraacetic acid
EELS	electron energy loss spectroscopy
EFF	empirical force field
EFFF	energy factored force field
EHMO, EHT	extended Hückel molecular orbital (theory)
EIS	electron impact spectroscopy; electrochemical impedance spectroscopy
ELS	energy loss spectroscopy
EM	extended molarity; electron microscopy
emf	electromotive force
EMPA, EMA	electron probe microanalysis
emu	electromagnetic unit system
en	ethylenediamine
ENDOR	electron-nuclear double resonance
EOS	equation of state
EPR	electron paramagnetic resonance
EPTC	dipropylcarbamothioic acid, *S*-ethyl ester
eq, eqn	equation
eqQ	quadrupole coupling constant
erf	error function
erg	erg (energy unit)
ESCA	electron spectroscopy for chemical analysis
ESD	electron stimulated desorption
e.s.d.	estimated standard deviation
ESR	electron spin resonance
est	estimated
esu	electrostatic unit system
ET	ephemeris time; electron transfer
Et	ethyl
Etn	ethanolamine
ETS	electron tunneling spectroscopy
Eu	Euler number
e.u.	entropy unit
eV	electronvolt
EXAFS	extended x-ray absorption fine structure (spectroscopy)
EXELFS	extended energy loss fine structure
exp	exponential function
expt	experimental
ext	external
F	farad
°F	degree Fahrenheit
F	Faraday constant; force; angular momentum
f	formation reaction; femto (SI prefix for 10^{-15})
f	activity coefficient; aperture ratio; focal length; force constant; frequency; fugacity
FAD	flavine adenine dinucleotide
fcc	face centered cubic
FEL	free electron laser
FEM	field emission microscopy
FEMO	free electron molecular orbital
FET	field effect transistor
fid	free induction decay
FIM	field ion microscopy
FIR	far infrared
fl	fluid (phase)
FM	frequency modulation
Fo	Fourier number
fp	freezing point
fpm	feet per minute
fps	feet per second; foot-pound-second system
Fr	franklin
Fr	Froude number
Fru	fructose
FSGO	floating spherical gaussian orbitals
FT	Fourier transform
ft	foot
ft-lb	foot pound
FTIR	Fourier transform infrared spectroscopy
FTMS	Fourier transform mass spectrometry
FTNMR	Fourier transform nuclear magnetic resonance
fus	fusion (melting)
FVP	flash vacuum pyrolysis
G	gauss; guanine (in genetic code); giga (SI prefix for 10^9)
G	electrical conductance; Gibbs energy; gravitational constant; sheer modulus
g	gram; gas (phase)
g	acceleration due to gravity; degeneracy; Landé g-factor; statistical weight
GABA	γ-aminobutyric acid
Gal	gal; galactose
gal	gallon
GalN	galactosamine
GC	gas chromatography
GC-MS	gas chromatography-mass spectroscopy
GDMS	glow discharge mass spectroscopy
GDP	guanosine 5'-diphosphate
gem	geminal (on the same carbon atom)
GeV	gigaelectronvolt
GIAO	gauge invariant atomic orbital
gl	glacial
GLC	gas-liquid chromatography
Glc	glucose
GlcA	gluconic acid
GlcN	glucosamine
GlcNAc	*N*-acetylglucosamine
GlcU	glucuronic acid
Gln	glutamine
Glu	glutamic acid
Gly	glycine
GMP	guanosine 5'-monophosphate
GMT	Greenwich mean time
gpm	gallons per minute
gps	gallon per second
Gr	Grashof number
gr	grain
Gra	glyceraldehyde
Gri	glyceric acid
Grn	glycerone [dihydroxyacetone]
Gro	glycerol
GTO	gaussian-type orbital

GTP	guanosine 5'-triphosphate
Gua	guanine
Gul	gulose
Guo	guanosine
GUT	grand unified theory
GVB	generalized valence bond (method)
GWS	Glashow-Weinberg-Salam (theory)
Gy	gray; gigayear
H	henry
H	enthalpy; Hamiltonian function; magnetic field
H_0	Hubble constant
h	helion; hour; hecto (SI prefix for 10^2)
h	Planck constant
Ha	Hartmann number
ha	hectare
HAM	hydrogenic atoms in molecules
hav	haversine
Hb	hemoglobin
HCA	heterocyclic amine
hcp	hexagonal closed packed
HDL	high-density lipoprotein
HEIS	high-energy ion scattering
HEP	high energy physics
Hepes	4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid
Hepps	4-(2-hydroxyethyl)-1-piperazinepropanesulfonic acid
HF	high frequency; Hartree-Fock (method)
HFA	hexafluoroacetone
HFO	Hartree-Fock orbital
hfs	hyperfine structure
His	histidine
HMO	Hückel molecular orbital
HMX	cyclotetramethylenetetranitramine
HN1	2-chloro-*N*-(2-chloroethyl)-*N*-ethylethanamine
HOAc	acetic acid
HOC	halogenated organic compound(s)
HOMAS	harmonic oscillator model of aromatic stabilization
HOMO	highest occupied molecular orbital
HOSE	harmonic oscillator stabilization energy
Hp	heptyl
hp	horsepower
HPLC	high-performance liquid chromatography
HQ	*p*-hydroquinone
hr	hour
HRE	Hückel resonance energy
HREELS	high resolution electron energy loss spectroscopy
HREM	high resolution electron microscopy
HSAB	hard-soft acid-base (theory)
HSE	homodesmotic stabilization energy
Hx	hexyl
Hyp	hypoxanthine
Hz	hertz
I	inositol
I	electric current; ionic strength; moment of inertia; nuclear spin angular momentum; radiant intensity
i	square root of minus one
i	electric current
I/O	input/output
IAT	international atomic time
IC	integrated circuit
ICD	induced circular dichroism
ICP	inductive-coupled plasma
ICR	ion cyclotron resonance
ID	inside diameter
id	ideal (solution)
Ido	iodose
IdoA	iduronic acid
IDP	inosine 5'-diphosphate
IE	ionization energy
i.e.p.	isoelectric point
IEPA	independent electron pair approximation
IF	intermediate frequency
IGLO	individual gauge for localized orbitals
Ile	isoleucine
Im	imaginary part
IMFP	inelastic mean free path (of electrons)
imm	immersion
IMP	inosine 5'-monophosphate
IMPATT	impact ionization avalanche transit time
in.	inch
INDO	immediate neglect of differential overlap
Ino	inosine
INS	inelastic neutron scattering; ion neutralization spectroscopy
Ins	*myo*-inositol
int	internal
IP	ionization potential
IPA	isopropyl alcohol
IPMA	ion probe microanalysis
IPN	interpenetrating polymer network
IPR	isotope perturbation of resonance
IPTS	International Practical Temperature Scale
IQ	2-amino-3-methyl-3*H*-imidazo(4,5-f)quinoline
IR	infrared
IRAS	infrared reflection-absorption spectroscopy
IRC	intrinsic reaction coordinate
IRS	infrared spectroscopy
isc	intersystem crossing
ISE	ion-selective electrode; isodesmic stabilization energy
ISS	ion scattering spectroscopy
ITP	inosine 5'-triphosphate
ITS	International Temperature Scale (1990)
IU	international unit
J	joule
J	angular momentum; electric current density; flux; Massieu function
j	angular momentum; electric current density
JT	Jahn-Teller (effect)
K	kelvin
K	absorption coefficient; bulk modulus; equilibrium constant; kinetic energy
k	kilo (SI prefix for 10^3)
k	absorption index; Boltzmann constant; rate constant; thermal conductivity; wave vector
kat	katal (unit of catalytic activity)
kb	kilobar; kilobases (DNA or RNA)
kcal	kilocalorie
KE	kinetic energy
keV	kiloelectronvolt
kg	kilogram
kgf	kilogram force
KIE	kinetic isotope effect
kJ	kilojoule
km	kilometer
Kn	Knudsen number
kPa	kilopascal

kt	karat
kV	kilovolt
kva	kilovolt ampere
kW	kilowatt
kwh	kilowatt hour
L	liter; lambert
L	Avogadro constant; inductance; Lagrange function; angular momentum
l	liter; liquid (phase)
l	angular momentum; length; mean free path; levorotatory
Lac	lactose
LAH	lithium aluminum hydride
lat.	latitude
lb	pound
lbf	pound force
LC	liquid chromatography
lc	liquid crystal (phase)
LCAO	linear combination of atomic orbitals
LD	lethal dose
LDA	local density approximation; lithium diisopropylamide
LDL	low-density lipoprotein
LDV	laser-Doppler velocimetry
Le	Lewis function
LE	localization energy
LEC	liquid exchange chromatography
LED	light emitting diode
LEED	low-energy electron diffraction
LEIS	low-energy ion scattering
Leu	leucine
LFER	linear free energy relationships
LFL	lower flammable limit
lim	limit
LIMS	laser ionization mass spectroscopy; laboratory information management system
liq	liquid
LLCT	ligand to ligand charge transfer
lm	lumen
LMCT	ligand to metal charge transfer
LMO	localized molecular orbital
LMR	laser magnetic resonance
ln	logarithm (natural)
LNDO	local neglect of differential overlap
log	logarithm (common)
LOMO	lowest occupied molecular orbital
long.	longitude
LSFE	linear field stabilization energy
LST	local sidereal time
LT	local time
LTE	local thermodynamic equilibrium
LUMO	lowest unoccupied molecular orbital
lx	lux
ly	langley
l.y.	light year
Lys	lysine
Lyx	lyxose
M	molar (as in 0.1 M solution); mega (SI prefix for 10^6)
M	magnetization; molar mass; mutual inductance; torque; angular momentum component; median
M_r	molecular weight (relative molar mass)
m	meter; molal (as in 0.1 m solution); metastable (isotope); milli (SI prefix for 10^{-3})
m	magnetic dipole moment; mass; molality; angular momentum component; *meta* (locant on aromatic ring)
Ma	Mach number
MA	maleic anhydride
Mal	maltose
Man	mannose
MASNMR	magic angle spinning nuclear magnetic resonance
max	maximum
Mb	myoglobin
MBE	molecular beam epitaxy
MBER	molecular beam electron resonance
MBPT	many body perturbation theory
MC	Monte Carlo (method)
MCAA	monochloroacetic acid
MCD	magnetic circular dichroism
MCPA	(4-chloro-2-methylphenoxy)acetic acid
MCPF	modified coupled pair functional
MCSCF	multiconfigurational self-consistent field (approximation)
MD	molecular dynamics (method)
Me	methyl
MeCCNU	1-(2-chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea
MeIQ	2-amino-3,4-dimethylimidazo[4,5-f]quinoline
MeIQx	2-amino-3,8-dimethylimidazo[4,5-f]quinoxaline
MEK	methyl ethyl ketone
MEP	molecular electrostatic potential
MERP	minimum energy reaction path
Mes	4-morpholineethanesulfonic acid
MESFET	metal-semiconductor field-effect transistor
Met	methionine
MeV	megaelectronvolt
meV	millielectronvolt
MF	molecular formula
mg	milligram
MHD	magnetohydrodynamics
mi	mile
min	minimum; minute
MINDO	modified INDO (method)
MIPK	methyl isopropyl ketone
MIR	mid infrared
misc	miscible
MKS	meter-kilogram-second system
MKSA	meter-kilogram-second-ampere system
mL, ml	milliliter
MM	molecular mechanics
mm	millimeter
MMDR	microwave-microwave double resonance
mmf	magnetomotive force
mmHg	millimeter of mercury
MNDO	modified neglect of diatomic overlap
MO	molecular orbital; methyl orange
MODR	microwave-optical double resonance
mol	mole
mol.wt.	molecular weight
mon	monomeric form
Mops	4-morpholinepropanesulfonic acid
MOS	metal-oxide semiconductor
MOSFET	metal-oxide semiconductor field-effect transistor
mp	melting point
MPa	megapascal
MPA	Mulliken population analysis

Mpc	megaparsec
MPTP	1,2,3,6-tetrahydro-1-methyl-4-phenylpyridine
MR	methyl red
MRD	multireference double substitution (method)
MRI	magnetic resonance imaging
mRNA	messenger RNA
MS	mass spectroscopy
ms	millisecond
MSA	methanesulfonic acid
MSDS	Material Safety Data Sheet
MSL	mean sea level
MTBE	methyl *tert*-butyl ether
Mur	muramic acid
mV	millivolt
MVK	methyl vinyl ketone
MW	megawatt; microwave; molecular weight
mW	milliwatt
Mx	maxwell
N	newton
N	angular momentum; neutron number; number density
N_A	Avogadro constant
n	neutron; nano (SI prefix for 10^{-9})
n	amount of substance; number density; principal quantum number; refractive index; normal (in chemical formulas)
NAA	nuclear activation analysis
NAAD	nicotinic acid adenine dinucleotide
NAD	nicotinamide adenine dinucleotide
NADH	reduced NAD
NADP	NAD phosphate
NANA	*N*-acetylneuraminic acid
NAO	natural atomic orbital
NBO	natural bond orbital
nbp	normal boiling point
NEDOR	nuclear electron double resonance
Neu	neuraminic acid
NEXAFS	near-edge x-ray absorption fine structure
ng	nanogram
NHO	natural hybrid orbital
NICS	nuclear independent chemical shift
NIR	near infrared; ribosylnicotinamide
nm	nanometer
NMN	β-nicotinamide mononucleotide
NMR	nuclear magnetic resonance
Nn	nonyl
NNDO	neglect of nonbonded differential overlap
NO	natural orbital
NOE	nuclear Overhauser effect
NOx	nitrogen oxides
NP	nitropyrene
NPA	natural population analysis
NQR	nuclear quadrupole resonance
NRA	nuclear reaction analysis
ns	nanosecond
NSE	neutron spin echo
NTP	normal temperature and pressure
Nu	nucleophile
Nu	Nusselt number
o	*ortho* (locant on aromatic ring)
obs, obsd	observed
Oc	octyl
OD	optical density; outside diameter
Oe	oersted
OFGF	outer valence Green's function (method)
ORD	optical rotatory dispersion
Oro	orotate; orotidine
oz	ounce
P	poise; peta (SI prefix for 10^{15})
P	power; pressure; probability; sound energy flux
p	proton; pico (SI prefix for 10^{-12})
p	dielectric polarization; electric dipole moment; momentum; pressure; bond order; *para* (as aromatic ring locant)
Pa	pascal
PA	proton affinity
PABA	*p*-aminobenzoic acid
PAH	polycyclic aromatic hydrocarbon(s)
PAM	polyacrylamide
PAN	1-(2-pyridylazo)-2-naphthol; polyacrylonitrile
PAR	4-(2'-pyridylazo)resorcinol
PAS	photoacoustic spectroscopy
PBA	poly(butyl acrylate)
PBB	polybrominated biphenyl
PBD	poly(1,3-butadiene)
PBMA	poly(butyl methacrylate)
PBT	poly(butylene terephthalate)
PC	paper chromatography
pc	parsec
PCM	polarizable continuum model
PCR	polymerase chain reaction
PD	potential difference
pdl	poundal
PDMS	poly(dimethylsiloxane)
Pe	pentyl
Pe	Péclet number
pe	probable error
PEA	poly(ethyl acrylate)
PEG	poly(ethylene glycol)
PEL	permissible exposure limit
PES	photoelectron spectroscopy; potential energy surface
PET	positron emission tomography; poly(ethylene terephthalate)
peth	petroleum ether
pf	power factor
PFOA	perfluorooctanoic acid
pg	picogram
Ph	phenyl
pH	negative log of hydrogen ion concentration
Phe	phenylalanine
PhIP	2-amino-1-methyl-6-phenylimidazo[4,5-b]pyridine
pI	isoelectric point
PIB	polyisobutylene
Pipes	1,4-piperazinediethanesulfonic acid
PIV	particle-image velocimetry
PIXE	particle induced x-ray emission
p*K*	negative log of ionization constant
PLM	principle of least motion
pm	picometer
PMA	poly(methyl acrylate)
PMMA	poly(methyl methacrylate)
PMO	perturbation MO (theory)
PNDO	partial neglect of differential overlap
PNO	pair natural orbitals
PNRA	prompt nuclear reaction analysis
POAV	π-orbital axis vector
pol	polymeric form

POx	phosphorus oxides
ppb	parts per billion
ppm	parts per million
PPO	poly(phenylene oxide)
PPP	Pariser-Parr-Pople (method)
ppt	parts per thousand; precipitate
Pr	propyl
Pr	Prandtl number
PRDDO	partial retention of diatomic differential overlap
Pro	proline
PS	photoelectron spectroscopy
ps	picosecond
PSD	photon stimulated desorption
psi	pounds per square inch
psia	pounds per square inch absolute
psig	pounds per square inch gage
PT	perturbation theory
pt	pint
PTMS	propyltrimethoxysilane
Pu	purine
PVA	poly(vinyl alcohol)
PVAc	poly(vinyl acetate)
PVC	poly(vinyl chloride)
PVDF	poly(vinylidene fluoride)
PVME	poly(methyl vinyl ether)
PVT	pressure-volume-temperature
Py	pyrimidine
Q	electric charge; heat; partition function; quadrupole moment; radiant energy; vibrational normal coordinate
q	electric field gradient; flow rate; heat; wave vector (phonons)
QCD	quantum chromodynamics
QCI	quadratic configuration interaction
QED	quantum electrodynamics
Q.E.D.	quod erat demonstrandum (which was to be proved)
QMRE	quantum mechanical resonance energy
QSAR	quantitative structure-activity relations
QSO	quasi-stellar object
qt	quart
quad	quadrillion BTU (=$1.055 \cdot 10^{18}$ joules)
Qui	quinovose
q.v.	quod vide (which you should see)
R	roentgen; alkyl radical (in chemical formulas)
°R	degree Rankine
R	electrical resistance; gas constant; molar refraction; Rydberg constant; coefficient of multiple correlation
r	reaction (as in $\Delta_r H$)
r	position vector; radius
RA	right ascension
rad	radian
RAIRS	reflection-absorption infrared spectroscopy
RAM	random access memory
RBS	Rutherford back scattering
Rbu, Rul	ribulose
RCI	ring current index
RDA	rubidium dihydrogen arsenate
Re	real part
RE	resonance energy
RED	radial electron distribution
REM	reflection electron microscopy
rem	roentgen equivalent man
REPE	resonance energy per electron
RF	radiofrequency
Rha	rhamnose
RHEED	reflection high-energy electron diffraction
RHF	restricted Hartree-Fock (theory)
RIA	radioimmunoassay
Rib	ribose
Ribulo	ribulose
rms	root-mean-square
RNA	ribonucleic acid
RNase	ribonuclease
ROHF	restricted open shell Hartree-Fock
ROM	read only memory
RPA	random phase approximation
RPH	reaction path Hamiltonian
RPLC	reversed-phase liquid chromatography
rpm	revolutions per minute
rps	revolutions per second
RRK	Rice-Ramsperger-Kassel (theory)
RRKM	Rice-Ramsperger-Kassel-Marcus (theory)
rRNA	ribosomal RNA
RRS	resonance Raman spectroscopy
RS	Raman spectroscopy
Ry	rydberg
S	siemens
S	area; entropy; probability current density; Poynting vector; symmetry coordinate; spin angular momentum
s	second; solid (phase)
s	path length; spin angular momentum; symmetry number; sedimentation coefficient; solubility; symmetrical (as stereochemical descriptor)
SALC	symmetry adapted linear combinations
SALI	surface analysis by laser ionization
SAM	scanning Auger microscopy
SAMS	self-assembled monolayers
SANS	small angle neutron scattering
Sar	sarcosine
sat, satd	saturated
SAXS	small angle x-ray scattering
Sc	Schmidt number
SC	spin-coupled (method)
SCD	state correlation diagram
SCE	saturated calomel electrode
SCF	self-consistent field (method)
SCR	silicon-controlled rectifier
SCRF	self-consistent reaction field (method)
sd	standard deviation
SDW	spin density wave
SE	strain energy
sec	secant; second
sec	secondary (in chemical name)
SECSY	spin-echo correlated spectroscopy
Sed	sedoheptulose
SEELFS	surface extended energy loss fine structure
SEM	scanning electron microscopy; standard error of the mean
sepn	separation
Ser	serine
SERS	surface-enhanced Raman spectroscopy
SET	single electron transfer
SEXAF	surface extended x-ray absorption fine structure
SFC	supercritical fluid chromatography
Sh	Sherwood number
Shy	thiohypoxanthine
SI	International System of Units

SILAR	successive ionic layer adsorption and reaction
SIMS	secondary-ion spectroscopy
sin	sine
sinh	hyperbolic sine
SIPN	semi-interpenetrating polymer network
SLAM	scanning laser acoustic microscopy
SMO	semiempirical molecular orbital
SMOW	Standard Mean Ocean Water
SNMS	sputtered neutral mass spectroscopy
Sno	thiouridine
SNU	solar neutrino unit
SOJT	second-order Jahn-Teller (effect)
sol	soluble; solution
soln, sln	solution
SOMO	singly occupied molecular orbital
Sor	sorbose
sp gr	specific gravity
SPM	scanned probe microscopy
sq	square
Sr	Strouhal number
sr	steradian
Srd	6-thioinosine
SSMS	source spark mass spectroscopy
St	stoke
St	Stanton number
std, stnd	standard (state)
STEL	short-term exposure limit
STEM	scanning transmission electron microscope
STM	scanning tunneling microscopy
STO	Slater-type orbital
STP	standard temperature and pressure
sub, subl	sublimes; sublimation
Suc, Sac	sucrose
Sur	thiouracil
Sv	sievert
T	tesla; tera (SI prefix for 10^{12})
T	kinetic energy; period; term value; temperature (thermodynamic); torque; transmittance
t	metric tonne; triton
t	Celsius temperature; thickness; time; transport number
Tal	talose
tan	tangent
tanh	hyperbolic tangent
Taps	3-{[2-hydroxy-1,1-bis(hydroxymethyl)ethyl]amino}-1-propanesulfonic acid
TBE	1,1,2,2-tetrabromoethane
TBP	tributyl phosphate
TCA	trichloroacetic acid
TCE	trichloroethylene
TCNQ	tetracyanoquinodimethane
TCP	tricresyl phosphate
TCSCF	two configuration self-consistent field
TDI	toluene diisocyanate
tDNA	transfer DNA
TE	transverse electric
TEA	triethanolamine; triethylamine
TED	transferred electron device; transmission electron diffraction
TEM	transverse electromagnetic; transmission electron microscope
temp	temperature
tert	tertiary (in chemical name)
Tes	2-{[2-hydroxy-1,1-bis(hydroxymethyl)ethyl]amino}-1-propanesulfonic acid
TFD	Thomas-Fermi-Dirac (method)
TGA	thermogravimetric analysis
Thd	ribosylthymine
theor	theoretical
thf, THF	tetrahydrofuran
Thr	threonine
Thy	thymine
TL	thermoluminescence
TLC	thin-layer chromatography
TLV	threshold limit value
TM	transverse magnetic
TMAB	tetrabutylammonium bromide
TMS	tetramethylsilane
tol	tolyl
TOPO	trioctylphosphine oxide
Torr	torr (pressure unit)
Tre	trehalose
TRE	topological resonance energy
Tricine	*N*-[2-hydroxy-1,1-bis(hydroxymethyl)ethyl]glycine
Tris	2-amino-2-(hydroxymethyl)-1,3-propanediol
tRNA	transfer RNA
Trp	tryptophan
trs	transition
TS	transition state
TSS	transition state spectroscopy
Tyr	tyrosine
U	uracil (in genetic code)
U	electric potential difference; internal energy
u	unified atomic mass unit
u	Bloch function; electric mobility; velocity
ua	astronomical unit (AU is also used)
UBFF	Urey-Bradley force field
UDMH	1,1-dimethylhydrazine
UDP	uridine 5'-diphosphate
UHF	ultrahigh frequency; unrestricted Hartree-Fock (method)
UMP	uridine 5'-monophosphate
uns, unsym	unsymmetrical (as chemical descriptor)
UPS, UPES	ultraviolet photoelectron spectroscopy
Ura	uracil
Urd	uridine
USP	United States Pharmacopeia
UT	universal time
UTP	uridine 5'-triphosphate
UV	ultraviolet
V	volt
V	electric potential; potential energy; volume
v	reaction rate; specific volume; velocity; vibrational quantum number; vicinal (as chemical descriptor)
v/v	volume per volume (volume of solute divided by volume of solution, expressed as percent)
Val	valine
vap	vaporization
VAT	vibration assisted tunneling
VB	valence band; valence bond (theory)
VCD	vibrational circular dichroism
VDW	van der Waals interaction
VHF	very high frequency
vic	vicinal (on adjacent carbon atom)
VIS	visible region of the spectrum
vit	vitreous (phase)

VOC	volatile organic compound(s)
VOFF	valence orbital force field
VPC	vapor phase chromatography
VSEPR	valence shell electron-pair repulsion (method)
VSIP	valence state ionization potential
VSLI	very large scale integrated (circuit)
VUV	vacuum ultraviolet
W	watt
W	radiant energy; statistical weight; work
w	energy density; mass fraction; velocity; work
w/v	weight per volume (mass of solute divided by volume of solution, usually expressed as g/100 mL)
w/w	weight per weight (mass of solute divided by mass of solution, expressed as percent)
WAXS	wide angle x-ray scattering
Wb	weber
We	Weber number
WKB	Wentzel-Kramers-Brillouin (approximation)
WLF	Williams-Landel-Ferry (equation)
wt	weight
X	X unit; halogen (in chemical formula)
X	reactance
x	mole fraction
XAFS	x-ray absorption fine structure
Xan	xanthine
XANES	x-ray absorption near-edge structure
Xao	xanthosine
Xlu, Xul	xylulose
XPS, XPES	x-ray photoelectron spectroscopy
XRD	x-ray diffraction
XRF	x-ray fluorescence
XRS	x-ray spectroscopy
Xyl	xylose
Y	yotta (SI prefix for 10^{24})
Y	admittance; Planck function; Young's modulus
y	yocto (SI prefix for 10^{-24})
y	mole fraction for gas (when *x* refers to liquid phase)
y, yr	year
yd	yard
Z	zetta (SI prefix for 10^{21})
Z	atomic number; compression factor; collision number; impedance; partition function; zusammen (*cis*-configuration)
z	zepto (SI prefix for 10^{-21})
z	charge number (of an ion); collision frequency factor
ZDO	zero differential overlap
ZINDO	Zerner's INDO method
ZPE, ZPVE	zero point vibrational energy
ZULU	Greenwich mean time
α	alpha particle
α	absorption coefficient; degree of dissociation; electric polarizability; expansion coefficient; fine structure constant
β	beta particle
β	reciprocal temperature parameter (= $1/kT$)
γ	photon; gamma (obsolete mass unit = μg)
γ	activity coefficient; conductivity; magnetogyric ratio; mass concentration; ratio of heat capacities; surface tension
Γ	Grüneisen parameter; level width; surface concentration
δ	chemical shift; Dirac delta function; Kronecker delta; loss angle
Δ	inertial defect; mass excess
ε	emittance; Levi-Civita symbol; linear strain; molar absorption coefficient; permittivity
ζ	Coriolis coupling constant; electrokinetic potential
η	overpotential; viscosity
κ	compressibility; conductivity; magnetic susceptibility; molar absorption coefficient
λ	absolute activity; radioactive decay constant; thermal conductivity; wavelength
Λ	angular momentum; ionic conductivity
μ	muon; micro (SI prefix for 10^{-6})
μ	chemical potential; electric dipole moment; electric mobility; friction coefficient; Joule-Thompson coefficient; magnetic dipole moment; mobility; permeability
μF	microfarad
μg	microgram
μm	micrometer
μs	microsecond
ν	frequency; kinematic velocity; stoichiometric number
ν_e	neutrino
ν	wavenumber
π	pion
Π	osmotic pressure; Peltier coefficient
ρ	density; reflectance; resistivity
σ	electrical conductivity; cross section; normal stress; shielding constant (NMR); Stefan-Boltzmann constant; surface tension; standard deviation
τ	transmittance; chemical shift; shear stress; relaxation time
ϕ	electrical potential; fugacity coefficient; osmotic coefficient; quantum yield; wavefunction
Φ	magnetic flux; potential energy; radiant power; work function
χ	magnetic susceptibility
χ_e	electric susceptibility
ψ	wavefunction
ω	circular frequency; angular velocity; harmonic vibration wavenumber; statistical weight
Ω	ohm
Ω	axial angular momentum; solid angle

GREEK, RUSSIAN, AND HEBREW ALPHABETS

The following table presents the Hebrew, Greek, and Russian alphabets, their letters, the names of the letters, and the English equivalents.

Hebrew[1,3]			Greek[4]			Russian	
א	aleph	’ 2	Α α	alpha	a	А а	a
ב	beth	b, bh	Β β	beta	b	Б б	b
ג	gimel	g, gh	Γ γ	gamma	g, n	В в	v
ד	daleth	d, dh	Δ δ	delta	d	Г г	g
ה	he	h	Ε ε	epsilon	e	Д д	d
ו	waw	w	Ζ ζ	zeta	z	Е е	e
ז	zayin	z	Η η	eta	ē	Ж ж	zh
ח	heth	ḥ	Θ θ	theta	th	З з	z
ט	teth	ṭ	Ι ι	iota	i	И и Й й	i, ĭ
י	yodh	y	Κ κ	kappa	k	К к	k
כ ך	kaph	k, kh	Λ λ	lambda	l	Л л	l
ל	lamedh	l	Μ μ	mu	m	М м	m
מ ם	mem	m	Ν ν	nu	n	Н н	n
נ ן	nun	n	Ξ ξ	xi	x	О о	o
ס	samekh	s	Ο ο	omicron	o	П п	p
ע	ayin	‘	Π π	pi	p	Р р	r
פ ף	pe	p, ph	Ρ ρ	rho	r, rh	С с	s
צ ץ	sadhe	ṣ	Σ σ ς	sigma	s	Т т	t
ק	qoph	q	Τ τ	tau	t	У у	u
ר	resh	r	Υ υ	upsilon	y, u	Ф ф	f
שׂ	sin	ś	Φ ϕ	phi	ph	Х х	kh
שׁ	shin	sh	Χ χ	chi	ch	Ц ц	ts
ת	taw	t, th	Ψ ψ	psi	ps	Ч ч	ch
			Ω ω	omega	ō	Ш ш	sh
						Щ щ	shch
						Ъ ъ[5]	”
						Ы ы	y
						Ь ь[6]	’
						Э э	e
						Ю ю	yu
						Я я	ya

[1] Where two forms of a letter are given, the second one is the form used at the end of a word.
[2] Not represented in transliteration when initial.
[3] The Hebrew letters are primarily consonants; a few of them are also used secondarily to represent certain vowels, when provided at all, by means of a system of dots or strokes adjacent to the consonated characters.
[4] The letter gamma is transliterated “n”only before velars; the letter upsilon is transliterated “u”only as the final element in diphthongs.
[5] This sign indicates that the immediately preceding consonant is not palatized even though immediately followed by a palatized vowel.
[6] This sign indicates that the immediately preceding consonant is palatized even though not immediately followed by a palatized vowel.

DEFINITIONS OF SCIENTIFIC TERMS

Brief definitions of selected terms of importance in chemistry, physics, and related fields of science are given in this section. The selection process emphasizes the following types of terms:

- Physical quantities
- Units of measure
- Classes of chemical compounds and materials
- Important theories, laws, and basic concepts.

Individual chemical compounds are not included.

Definitions have taken wherever possible from the recommendations of international or national bodies, especially the International Union of Pure and Applied Chemistry (IUPAC) and International Organization for Standardization (ISO). For physical quantities and units, the recommended symbol is also given. The source of such definitions is indicated by the reference number in brackets following the definition. In many cases these official definitions have been edited in the interest of stylistic consistency and economy of space. The user is referred to the original source for further details.

An asterisk (*) following a term indicates that further information can be found by consulting the index of this handbook under the entry for that term.

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***Ab initio* method** - An approach to quantum-mechanical calculations on molecules which starts with the Schrödinger equation and carries out a complete integration, without introducing empirical factors derived from experimental measurement.

Absorbance (*A*) - Defined as $-\log(1-\alpha) = \log(1/\tau)$, where α is the absorptance and τ the transmittance of a medium through which a light beam passes. [2]

Absorbed dose (*D*) - For any ionizing radiation, the mean energy imparted to an element of irradiated matter divided by the mass of that element. [1]

Absorptance (α) - Ratio of the radiant or luminous flux in a given spectral interval absorbed in a medium to that of the incident radiation. Also called absorption factor. [1]

Absorption coefficient (*a*) - The relative decrease in the intensity of a collimated beam of electromagnetic radiation, as a result of absorption by a medium, during traversal of an infinitesimal layer of the medium, divided by the length traversed. [1]

Absorption coefficient, molar (ε) - Absorption coefficient divided by amount-of-substance concentration of the absorbing material in the sample solution ($\varepsilon = a/c$). The SI unit is m^2/mol. Also called extinction coefficient, but usually in units of $mol^{-1}dm^3cm^{-1}$. [2]

Acceleration - Rate of change of velocity with respect to time.

Acceleration due to gravity (*g*)* - The standard value (9.80665 m/s^2) of the acceleration experienced by a body in the earth's gravitational field. [1]

Acenes - Polycyclic aromatic hydrocarbons consisting of fused benzene rings in a rectilinear arrangement. [5]

Acid - Historically, a substance that yields an H^+ ion when it dissociates in solution, resulting in a pH<7. In the Brönsted definition, an acid is a substance that donates a proton in any type of reaction. The most general definition, due to G.N. Lewis, classifies any chemical species capable of accepting an electron pair as an acid.

Acid dissociation constant (K_a)* - The equilibrium constant for the dissociation of an acid HA through the reaction $HA + H_2O \rightleftharpoons A^- + H_3O^+$. The quantity $pK_a = -\log K_a$ is often used to express the acid dissociation constant.

Actinides - The elements of atomic number 89 through 103, e.g., Ac, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr. [7]

Activation energy* - In general, the energy that must be added to a system in order for a process to occur, even though the process may already be thermodynamically possible. In chemical kinetics, the activation energy is the height of the potential barrier separating the products and reactants. It determines the temperature dependence of the reaction rate.

Activity - For a mixture of substances, the absolute activity λ of substance B is defined as $\lambda_B = \exp(\mu_B/RT)$, where μ_B is the chemical potential of substance B, R the gas constant, and T the thermodynamic temperature. The relative activity a is defined as $a_B = \exp[(\mu_B-\mu_B^\circ)/RT]$, where μ_B° designates the chemical potential in the standard state. [2]

Activity coefficient (γ)* - Ratio of the activity a_B of component B of a mixture to the concentration of that component. The value of γ depends on the method of stating the composition. For mole fraction x_B, the relation is $a_B = \gamma_B x_B$; for molarity c_B, it is $a_B = \gamma_B c_B/c^\circ$, where c° is the standard state composition (typically chosen as 1 mol/L); for molality m_B, it is $a_B = \gamma_B m_B/m^\circ$, where m° is the standard state molality (typically 1 mol/kg). [2]

Activity, of radioactive substance (*A*) - The average number of spontaneous nuclear transitions from a particular energy state occurring in an amount of a radionuclide in a small time interval divided by that interval. [1]

Acyl groups - Groups formed by removing the hydroxy groups from oxoacids that have the general structure RC(=O)(OH) and replacement analogues of such acyl groups. [5]

Adiabatic process - A thermodynamic process in which no heat enters or leaves the system.

Admittance (*Y*) - Reciprocal of impedance. $Y = G + iB$, where G is conductance and B is susceptance. [1]

Adsorption - A process in which molecules of gas, of dissolved substances in liquids, or of liquids adhere in an extremely thin layer to surfaces of solid bodies with which they are in contact. [10]

Albedo* - The ratio of the light reflected or scattered from a surface to the intensity of incident light. The term is often used in reference to specific types of terrain or to entire planets.

Alcohols - Compounds in which a hydroxy group, -OH, is attached to a saturated carbon atom. [5]

Aldehydes - Compounds RC(=O)H, in which a carbonyl group is bonded to one hydrogen atom and to one R group. [5]

Aldoses - Aldehydic parent sugars (polyhydroxyaldehydes $H[CH(OH)]_nC(=O)H$, $n>1$) and their intramolecular hemiacetals. [5]

Aldoximes - Oximes of aldehydes: RCH=NOH. [5]

Alfvén number (*Al*) - A dimensionless quantity used in plasma physics, defined by $Al = v(\rho\mu)^{1/2}/B$, where ρ is density, v is velocity, μ is permeability, and B is magnetic flux density. [2]

Alfven waves - Very low frequency waves which can exist in a plasma in the presence of a uniform magnetic field. Also called magnetohydrodynamic waves.

Alicyclic compounds - Aliphatic compounds having a carbocyclic ring structure which may be saturated or unsaturated, but may not be a benzenoid or other aromatic system. [5]

Aliphatic compounds - Acyclic or cyclic, saturated or unsaturated carbon compounds, excluding aromatic compounds. [5]

Alkali metals - The elements lithium, sodium, potassium, rubidium, cesium, and francium.

Alkaline earth metals - The elements calcium, strontium, barium, and radium. [7]

Alkaloids - Basic nitrogen compounds (mostly heterocyclic) occurring mostly in the plant kingdom (but not excluding those of animal origin). Amino acids, peptides, proteins, nucleotides, nucleic acids, and amino sugars are not normally regarded as alkaloids. [5]

Alkanes - Acyclic branched or unbranched hydrocarbons having the general formula C_nH_{2n+2}, and therefore consisting entirely of hydrogen atoms and saturated carbon atoms. [5]

Alkenes - Acyclic branched or unbranched hydrocarbons having one carbon-carbon double bond and the general formula C_nH_{2n}. Acyclic branched or unbranched hydrocarbons having more than one double bond are alkadienes, alkatrienes, etc. [5]

Alkoxides - Compounds, ROM, derivatives of alcohols, ROH, in which R is saturated at the site of its attachment to oxygen and M is a metal or other cationic species. [5]

Alkyl groups - Univalent groups derived from alkanes by removal of a hydrogen atom from any carbon atom: C_nH_{2n+1}-. The groups derived by removal of a hydrogen atom from a terminal carbon atom of unbranched alkanes form a subclass of normal alkyl (*n*-alkyl) groups. The groups RCH_2-, R_2CH-, and R_3C- (R not equal to H) are primary, secondary, and tertiary alkyl groups, respectively. [5]

Alkynes - Acyclic branched or unbranched hydrocarbons having a carbon-carbon triple bond and the general formula C_nH_{2n-2}, RC≡CR′. Acyclic branched or unbranched hydrocarbons having more than one triple bond are known as alkadiynes, alkatriynes, etc. [5]

Allotropy - The occurrence of an element in two or more crystalline forms.

Allylic groups - The group CH_2=$CHCH_2$- (allyl) and derivatives formed by substitution. The term 'allylic position' or 'allylic site' refers to the saturated carbon atom. A group, such as -OH, attached at an allylic site is sometimes described as "allylic". [5]

Amagat volume unit - A non-SI unit previously used in high pressure science. It is defined as the molar volume of a real gas at one atmosphere pressure and 273.15 K. The approximate value is 22.4 L/mol.

Amides - Derivatives of oxoacids R(C=O)(OH) in which the hydroxy group has been replaced by an amino or substituted amino group. [5]

Amine oxides - Compounds derived from tertiary amines by the attachment of one oxygen atom to the nitrogen atom: R_3N^+-O^-. By extension the term includes the analogous derivatives of primary and secondary amines. [5]

Amines - Compounds formally derived from ammonia by replacing one, two, or three hydrogen atoms by hydrocarbyl groups, and having the general structures RNH_2 (primary amines), R_2NH (secondary amines), R_3N (tertiary amines). [5]

Amino acids* - Compounds containing both a carboxylic acid group (-COOH) and an amino group ($-NH_2$). The most important are the α-amino acids, in which the $-NH_2$ group in attached to the C atom adjacent to the -COOH group. In the β-amino acids, there is an intervening carbon atom. [4]

Ampere (A)* - The SI base unit of electric current. [1]

Ampere's law - The defining equation for the magnetic induction $\boldsymbol{B}$, viz., $d\boldsymbol{F} = I d\boldsymbol{l} \times \boldsymbol{B}$, where $d\boldsymbol{F}$ is the force produced by a current I flowing in an element of the conductor $d\boldsymbol{l}$ pointing in the direction of the current.

Ångström (Å) - A unit of length used in spectroscopy, crystallography, and molecular structure, equal to 10^{-10} m.

Angular momentum (*L*) - The angular momentum of a particle about a point is the vector product of the radius vector from this point to the particle and the momentum of the particle; i.e., $\boldsymbol{L} = \boldsymbol{r} \times \boldsymbol{p}$. [1]

Angular velocity (ω) - The angle through which a body rotates per unit time.

Anilides - Compounds derived from oxoacids R(C=O)(OH) by replacing the -OH group by the -NHPh group or derivative formed by ring substitution. Also used for salts formed by replacement of a nitrogen-bound hydrogen of aniline by a metal. [5]

Anion - A negatively charged atomic or molecular particle.

Antiferroelectricity* - An effect analogous to antiferromagnetism in which electric dipoles in a crystal are ordered in two sublattices that are polarized in opposite directions, leading to zero net polarization. The effect vanishes above a critical temperature.

Antiferromagnetism* - A type of magnetism in which the magnetic moments of atoms in a solid are ordered into two antiparallel aligned sublattices. Antiferromagnets are characterized by a zero or small positive magnetic susceptibility. The

susceptibility increases with temperature up to a critical value, the Néel temperature, above which the material becomes paramagnetic.

Antiparticle - A particle having the same mass as a given elementary particle and a charge equal in magnitude but opposite in sign.

Appearance potential* **-** The lowest energy which must be imparted to the parent molecule to cause it to produce a particular specified parent ion. This energy, usually stated in eV, may be imparted by electron impact, photon impact, or in other ways. More properly called appearance energy. [3]

Appearance potential spectroscopy (APS) - See Techniques for Materials Characterization, page 12-1.

Are (a) - A unit of area equal to 100 m^2. [1]

Arenes - Monocyclic and polycyclic aromatic hydrocarbons. See aromatic compounds. [5]

Aromatic compounds - Compounds whose structure includes a cyclic delocalized π-electron system. Historical use of the term implies a ring containing only carbon (e.g., benzene, naphthalene), but it is often generalized to include heterocyclic structures such as pyridine and thiophene. [5]

Arrhenius equation - A key equation in chemical kinetics which expresses the rate constant k as $k = A\exp(-E_a/RT)$, where E_a is the activation energy, R the molar gas constant, and T the temperature. A is called the preexponential factor and, for simple gas phase reactions, may be identified with the collision frequency.

Arsines - AsH_3 and compounds derived from it by substituting one, two or three hydrogen atoms by hydrocarbyl groups. $RAsH_2$, R_2AsH, R_3As (R not equal to H) are called primary, secondary and tertiary arsines, respectively. [5]

Aryl groups - Groups derived from arenes by removal of a hydrogen atom from a ring carbon atom. Groups similarly derived from heteroarenes are sometimes subsumed in this definition. [5]

Astronomical unit (AU)* **-** The mean distance of the earth from the sun, equal to $1.49597870 \times 10^{11}$ m.

Atomic absorption spectroscopy (AAS) - See Techniques for Materials Characterization, page **12**-1.

Atomic emission spectroscopy (AES) - See Techniques for Materials Characterization, page **12**-1.

Atomic force microscopy (AFM) - See Techniques for Materials Characterization, page 12-1.

Atomic mass* - The mass of a nuclide, normally expressed in unified atomic mass units (u).

Atomic mass unit (u)* - A unit of mass used in atomic, molecular, and nuclear science, defined as the mass of one atom of ^{12}C divided by 12. Its approximate value is 1.66054×10^{-27} kg. Also called the unified atomic mass unit. [1]

Atomic number (*Z*) - A characteristic property of an element, equal to the number of protons in the nucleus.

Atomic weight (A_r)* - The ratio of the average mass per atom of an element to 1/12 of the mass of nuclide ^{12}C. An atomic weight can be defined for a sample of any given isotopic composition. The standard atomic weight refers to a sample of normal terrestrial isotopic composition. The term relative atomic mass is synonymous with atomic weight. [2]

Attenuated total reflection (ATR) - See Techniques for Materials Characterization, page 12-1.

Auger effect - An atomic process in which an electron from a higher energy level fills a vacancy in an inner shell, transferring the released energy to another electron which is ejected.

Aurora - An atmospheric phenomenon in which streamers of light are produced when electrons from the sun are guided into the thermosphere by the earth's magnetic field. It occurs in the polar regions at altitudes of 95—300 km.

Avogadro constant (N_A)* - The number of elementary entities in one mole of a substance.

Azeotrope - A liquid mixture in a state where the variation of vapor pressure with composition at constant temperature (or, alternatively, the variation of normal boiling point with composition) shows either a maximum or a minimum. Thus when an azeotrope boils the vapor has the same composition as the liquid.

Azides - Compounds bearing the group $-N_3$, viz. $-N{=}N^+{=}N^-$; usually attached to carbon, e.g. PhN_3, phenyl azide or azidobenzene. Also used for salts of hydrazoic acid, HN_3, e.g. NaN_3, sodium azide. [5]

Azines - Condensation products, $R_2C{=}NN{=}CR_2$, of two moles of a carbonyl compound with one mole of hydrazine. [5]

Azo compounds - Derivatives of diazene (diimide), HN=NH, wherein both hydrogens are substituted by hydrocarbyl groups, e.g., PhN=NPh, azobenzene or diphenyldiazene. [5]

Balmer series - The series of lines in the spectrum of the hydrogen atom which corresponds to transitions between the state with principal quantum number $n = 2$ and successive higher states. The wavelengths are given by $1/\lambda = R_H(1/4 - 1/n^2)$, where n = 3,4,... and R_H is the Rydberg constant for hydrogen. The first member of the series ($n = 2 \rightleftharpoons 3$), which is often called the H_α line, falls at a wavelength of 6563 Å.

Bar (bar) - A unit of pressure equal to 10^5 Pa.´

Bardeen-Cooper-Schrieffer (BCS) theory - A theory of superconductivity which is based upon the formation of electron pairs as a result of an electron-lattice interaction. The theory relates the superconducting transition temperature to the density of states and the Debye temperature.

Barn (b) - A unit used for expressing cross sections of nuclear processes, equal to 10^{-28} m^2.

Barrel - A unit of volume equal to 158.9873 L.

Baryon - Any elementary particle built up from three quarks. Examples are the proton, neutron, and various short-lived hyperons. Baryons have odd half-integer spins.

Base - Historically, a substance that yields an OH^- ion when it dissociates in solution, resulting in a pH>7. In the Brönsted definition, a base is a substance capable of accepting a proton in any type of reaction. The more general definition, due to G.N. Lewis, classifies any chemical species capable of donating an electron pair as a base.

Becquerel (Bq)* - The SI unit of radioactivity (disintegrations per unit time), equal to s^{-1}. [1]

Beer's law - An approximate expression for the change in intensity of a light beam that passes through an absorbing medium, viz., $\log(I/I_0) = -\varepsilon cl$, where I_0 is the incident intensity, I is the final intensity, ε is the molar (decadic) absorption coefficient, c is the molar concentration of the absorbing substance, and l is the path length. Also called the Beer-Lambert law

Binding energy* - A generic term for the energy required to decompose a system into two or more of its constituent parts. In nuclear physics, the binding energy is the energy differ-

ence between a nucleus and the separated nucleons of which it is composed (the energy equivalent of the mass defect). In atomic physics, it is the energy required to remove an electron from an atom.

Biot (Bi) - A name sometimes used for the unit of current in the emu system.

Birefringence - A property of certain crystals in which two refracted rays result from a single incident light ray. One, the ordinary ray, follows the normal laws of refraction, while the other, the extraordinary ray, exhibits a variable refractive index which depends on the direction in the crystal.

Black body radiation* - The radiation emitted by a perfect black body, i.e., a body which absorbs all radiation incident on it and reflects none. The wavelength dependence of the radiated energy density ρ (energy per unit volume per unit wavelength range) is given by the Planck formula

$$\rho = \frac{8\pi hc}{\lambda^5 (e^{hc/\lambda kt} - 1)}$$

where λ is the wavelength, h is Planck's constant, c is the speed of light, k is the Boltzmann constant, and T is the temperature.

Black hole - A very dense object, formed in a supernova explosion, whose gravitational field is so large that no matter or radiation can escape from the object.

Bloch wave function - A solution of the Schrödinger equation for an electron moving in a spatially periodic potential; used in the band theory of solids.

Bohr magneton (μ_B)* - The atomic unit of magnetic moment, defined as $eh/4\pi m_e$, where h is Planck's constant, m_e the electron mass, and e the elementary charge. It is the moment associated with a single electron spin.

Bohr, bohr radius (a_0)* - The radius of the lowest orbit in the Bohr model of the hydrogen atom, defined as $\varepsilon_o h^2/\pi m_e e^2$, where ε_o is the permittivity of a vacuum, h is Planck's constant, m_e the electron mass, and e the elementary charge. It is customarily taken as the unit of length when using atomic units.

Boiling point - The temperature at which the liquid and gas phases of a substance are in equilibrium at a specified pressure. The normal boiling point is the boiling point at normal atmospheric pressure (101.325 kPa).

Boltzmann constant (k)* - The molar gas constant R divided by Avogadro's constant.

Boltzmann distribution - An expression for the equilibrium distribution of molecules as a function of their energy, in which the number of molecules in a state of energy E is proportional to $\exp(-E/kT)$, where k is the Boltzmann constant and T is the temperature.

Bond strength - See Dissociation energy.

Born-Haber cycle* - A thermodynamic cycle in which a crystalline solid is converted to gaseous ions and then reconverted to the solid. The cycle permits calculation of the lattice energy of the crystal.

Bose-Einstein distribution - A modification of the Boltzmann distribution which applies to a system of particles that are bosons. The number of particles of energy E is proportional to $[e^{(E-\mu)/kT}-1]^{-1}$, where μ is a normalization constant, k is the Boltzmann constant, and T is the temperature.

Boson - A particle that obeys Bose-Einstein Statistics; specifically, any particle with spin equal to zero or an integer. This includes the photon, pion, deuteron, and all nuclei of even mass number.

Boyle's law - The empirical law, exact only for an ideal gas, which states that the volume of a gas is inversely proportional to its pressure at constant temperature.

Bragg angle (θ) - Defined by the equation $n\lambda = 2d\sin\theta$, which relates the angle θ between a crystal plane and the diffracted x-ray beam, the wavelength λ of the x-rays, the crystal plane spacing d, and the diffraction order n (any integer).

Bravais lattices* - The 14 distinct crystal lattices that can exist in three dimensions. They include three in the cubic crystal system, two in the tetragonal, four in the orthorhombic, two in the monoclinic, and one each in the triclinic, hexagonal, and trigonal systems.

Breakdown voltage - The potential difference at which an insulating substance undergoes a physical or chemical change that causes it to become a conductor, thus allowing current to flow through the sample.

Bremsstrahlung - Electromagnetic radiation generated when the velocity of a charged particle is reduced (literally, "braking radiation"). An example is the x-ray continuum resulting from collisions of electrons with the target in an x-ray tube.

Brewster angle - The angle of incidence for which the maximum degree of plane polarization occurs when a beam of unpolarized light is incident on the surface of a medium of refractive index n. At this angle, the angle between the reflected and refracted beams is 90°. The value of the Brewster angle is $\tan^{-1} n$.

Brillouin scattering - The scattering of light by acoustic phonons in a solid or liquid.

Brillouin zone - A region of allowed wave vectors and energy levels in a crystalline solid, which plays a part in the propagation of waves through the lattice.

British thermal unit (Btu) - A non-SI unit of energy, equal to approximately 1055 J. Several values of the Btu, defined in slightly different ways, have been used.

Brownian motion - The random movements of small particles suspended in a fluid, which arise from collisions with the fluid molecules.

Brunauer-Emmett-Teller method (BET) - See Techniques for Materials Characterization, page 12-1.

Buffer* - A solution designed to maintain a constant pH when small amounts of a strong acid or base are added. Buffers usually consist of a fairly weak acid and its salt with a strong base. Suitable concentrations are chosen so that the pH of the solution remains close to the pK_a of the weak acid.

Calorie (cal) - A non-SI unit of energy, originally defined as the heat required to raise the temperature of 1 g of water by 1°C. Several calories of slightly different values have been used. The thermochemical calorie is now defined as 4.184 J.

Candela (cd)* - The SI base unit of luminous intensity. [1]

Capacitance (C) - Ratio of the charge acquired by a body to the change in potential. [1]

Carbamates - Salts or esters of carbamic acid, $H_2NC(=O)OH$, or of N-substituted carbamic acids: $R_2NC(=O)OR'$, (R′ = hydrocarbyl or a cation). The esters are often called urethanes or urethans, a usage that is strictly correct only for the ethyl esters. [5]

Carbenes - The electrically neutral species H_2C: and its derivatives, in which the carbon is covalently bonded to two univa-

lent groups of any kind or a divalent group and bears two nonbonding electrons, which may be spin-paired (singlet state) or spin-non-paired (triplet state). [5]

Carbinols - An obsolete term for substituted methanols, in which the name carbinol is synonymous with methanol. [5]

Carbohydrates - Originally, compounds such as aldoses and ketoses, having the stoichiometric formula $C_n(H_2O)_n$ (hence "hydrates of carbon"). The generic term carbohydrate now includes mono-, oligo-, and polysaccharides, as well as their reaction products and derivatives. [5]

Carboranes - A contraction of carbaboranes. Compounds in which a boron atom in a polyboron hydride is replaced by a carbon atom with maintenance of the skeletal structure. [5]

Carboxylic acids - Oxoacids having the structure RC(=O)OH. The term is used as a suffix in systematic name formation to denote the -C(=O)OH group including its carbon atom. [5]

Carnot cycle - A sequence of reversible changes in a heat engine using a perfect gas as the working substance, which is used to demonstrate that entropy is a state function. The Carnot cycle also provides a means to calculate the efficiency of a heat engine.

Catalyst - A substance that participates in a particular chemical reaction and thereby increases its rate but without a net change in the amount of that substance in the system. [3]

Catenanes, catena compounds - Hydrocarbons having two or more rings connected in the manner of links of a chain, without a covalent bond. More generally, the class catena compounds embraces functional derivatives and hetero analogues. [5]

Cation - A positively charged atomic or molecular particle.

Centipoise (cP) - A common non-SI unit of viscosity, equal to mPa s.

Centrifugal distortion - An effect in molecular spectroscopy in which rotational levels are lowered in energy, relative to the values of a rigid rotor, as the rotational angular momentum increases. The effect may be understood classically as a stretching of the bonds in the molecule as it rotates faster, thus increasing the moment of inertia.

Ceramic - A nonmetallic material of very high melting point.

Cerenkov radiation - Light emitted when a beam of charged particles travels through a medium at a speed greater than the speed of light in the medium. It is typically blue in color.

Cgs system of units - A system of units based upon the centimeter, gram, and second. The cgs system has been supplanted by the International System (SI).

Chalcogens - The Group VIA elements (oxygen, sulfur, selenium, tellurium, and polonium). Compounds of these elements are called chalcogenides. [7]

Chaotic system - A complex system whose behavior is governed by deterministic laws but whose evolution can vary drastically when small changes are made in the initial conditions.

Charge - See Electric charge.

Charles' law - The empirical law, exact only for an ideal gas, which states that the volume of a gas is directly proportional to its temperature at constant pressure.

Charm - A quantum number introduced in particle physics to account for certain properties of elementary particles and their reactions.

Chelate - A compound characterized by the presence of bonds from two or more bonding sites within the same ligand to a central metal atom. [3]

Chemical potential - For a mixture of substances, the chemical potential of constituent B is defined as the partial derivative of the Gibbs energy G with respect to the amount (number of moles) of B, with temperature, pressure, and amounts of all other constituents held constant. Also called partial molar Gibbs energy. [2]

Chemical shift* - A small change in the energy levels (and hence in the spectra associated with these levels) resulting from the effects of chemical binding in a molecule. The term is used in fields such as NMR, Mössbauer, and photoelectron spectroscopy, where the energy levels are determined primarily by nuclear or atomic effects.

Chiral molecule - A molecule which cannot be superimposed on its mirror image. A common example is an organic molecule containing a carbon atom to which four different atoms or groups are attached. Such molecules exhibit optical activity, i.e., they rotate the plane of a polarized light beam.

Chlorocarbons - Compounds consisting solely of chlorine and carbon. [5]

Chromatography* - A method for separation of the components of a sample in which the components are distributed between two phases, one of which is stationary while the other moves. In gas chromatography the gas moves over a liquid or solid stationary phase. In liquid chromatography the liquid mixture moves through another liquid, a solid, or a gel. The mechanism of separation of components may be adsorption, differential solubility, ion-exchange, permeation, or other mechanisms. [6]

Clapeyron equation - A relation between pressure and temperature of two phases of a pure substance that are in equilibrium, viz., $\mathrm{d}p/\mathrm{d}T = \Delta_{trs}S/\Delta_{trs}V$, where $\Delta_{trs}S$ is the difference in entropy between the phases and $\Delta_{trs}V$ the corresponding difference in volume.

Clathrates - Inclusion compounds in which the guest molecule is in a cage formed by the host molecule or by a lattice of host molecules. [5]

Clausius (Cl) - A non-SI unit of entropy or heat capacity defined as cal/K = 4.184 J/K. [2]

Clausius-Clapeyron equation - An approximation to the Clapeyron equation applicable to liquid-gas and solid-gas equilibrium, in which one assumes an ideal gas with volume much greater than the condensed phase volume. For the liquid-gas case, it takes the form $\mathrm{d}(\ln p)/\mathrm{d}T = \Delta_{vap}H/RT^2$, where R is the molar gas constant and $\Delta_{vap}H$ is the molar enthalpy of vaporization. For the solid-gas case, $\Delta_{vap}H$ is replaced by the molar enthalpy of sublimation, $\Delta_{sub}H$.

Clausius-Mosotti equation - A relation between the dielectric constant ε_r at optical frequencies and the polarizability α:

$$\frac{\varepsilon_r - 1}{\varepsilon_r + 2} = \frac{\rho N_A \alpha}{3M\varepsilon_0}$$

where ρ is density, N_A is Avogadro's number, M is molar mass, and ε_0 is the permittivity of a vacuum.

Clebsch-Gordon coefficients - A set of coefficients used to describe the vector coupling of angular momenta in atomic and nuclear physics.

Codon - A set of three bases, chosen from the four primary bases found in the DNA molecule (uracil, cytosine, adenine, and guanine), which specifies the production of a particular amino

acid or carries some other genetic instruction. For example, the codon UCA specifies the amino acid serine, CAG specifies glutamine, etc. There are a total of 64 codons.

Coercive force - The magnetizing force at which the magnetic flux density is equal to zero. [10]

Coercivity* - The maximum value of coercive force that can be attained when a magnetic material is symmetrically magnetized to saturation induction. [10]

Coherent anti-Stokes Raman spectroscopy (CARS) - See Techniques for Materials Characterization, page **12-1**.

Colloid - Molecules or polymolecular particles dispersed in a medium that have, at least in one direction, a dimension roughly between 1 nm and 1 μm. [3]

Color center - A defect in a crystal that gives rise to optical absorption, thus changing the color of the material. A common type is the F-center, which results when an electron occupies the site of a negative ion.

Compressibility (κ)* - The fractional change of volume as pressure is increased, viz., $\kappa = -(1/V)(dV/dp)$. [1]

Compton wavelength (λ_C)* - In the scattering of electromagnetic radiation by a free particle (e.g., electron, proton), $\lambda_C = h/mc$ is the increase in wavelength, at a 90° scattering angle, corresponding to the transfer of energy from radiation to particle. Here h is Planck's constant, c the speed of light, and m the mass of the particle.

Conductance (G)* - For direct current, the reciprocal of resistance. More generally, the real part of admittance. [1]

Conductivity, electrical (σ)* - The reciprocal of the resistivity. [1]

Conductivity, thermal - See Thermal conductivity.

Congruent transformation - A phase transition (melting, vaporization, etc.) in which the substance preserves its exact chemical composition.

Constitutional repeating unit (CRU) - In polymer science, the smallest constitutional unit, the repetition of which constitutes a regular macromolecule, i.e., a macromolecule with all units connected identically with respect to directional sense. [8]

Copolymer - A polymer derived from more than one species of monomer. [8]

Coriolis effect - The deviation from simple trajectories when a mechanical system is described in a rotating coordinate system. It affects the motion of projectiles on the earth and in molecular spectroscopy leads to an important interaction between the rotational and vibrational motions. The effect may be described by an additional term in the equations of motion, called the Coriolis force.

Cosmic rays* - High energy nuclear particles, electrons, and photons, originating mostly outside the solar system, which continually bombard the earth's atmosphere.

Coulomb (C)* - The SI unit of electric charge, equal to A s. [1]

Coulomb's law - The statement that the force F between two electrical charges q_1 and q_2 separated by a distance r is $F = (4\pi\varepsilon_0)^{-1} q_1 q_2 / r^2$, where ε_0 is the permittivity of a vacuum.

Covalent bond - A chemical bond between two atoms whose stability results from the sharing of two electrons, one from each atom.

Cowling number (Co) - A dimensionless quantity used in plasma physics, defined by $Co = B^2/\mu\rho v^2$, where ρ is density, v is velocity, μ is permeability, and B is magnetic flux density. [2]

CPT theorem - A theorem in particle physics which states that any local Lagrangian theory that is invariant under proper Lorentz transformations is also invariant under the combined operations of charge conjugation, C, space inversion, P, and time reversal, T, taken in any order.

Critical point* - In general, the point on the phase diagram of a two-phase system at which the two coexisting phases have identical properties and therefore represent a single phase. At the liquid-gas critical point of a pure substance, the distinction between liquid and gas vanishes, and the vapor pressure curve ends. The coordinates of this point are called the critical temperature and critical pressure. Above the critical temperature, it is not possible to liquefy the substance.

Cross section (σ)* - A measure of the probability of collision (or other interaction) between a beam of particles and a target which it encounters. In rough terms it is the effective area the target particles present to the incident ones; however, the precise definition depends on the nature of the interaction. A general definition of σ is the number of encounters per unit time divided by nv, where n is the concentration of incident particles and v their velocity.

Crosslink - In polymer science, a small region in a macromolecule from which at least four chains emanate, and formed by reactions involving sites or groups on existing macromolecules or by interactions between existing macromolecules. [8]

Crown compounds - Macrocyclic polydentate compounds, usually uncharged, in which three or more coordinating ring atoms (usually oxygen or nitrogen) are or may become suitably close for easy formation of chelate complexes with metal ions or other cationic species. [5]

Crust* - The outer layer of the solid earth, above the Mohorovicic discontinuity. Its thickness averages about 35 km on the continents and about 7 km below the ocean floor.

Cryoscopic constant (E_f)* - The constant that expresses the amount by which the freezing point T_f of a solvent is lowered by a non-dissociating solute, through the relation $\Delta T_f = E_f m$, where m is the molality of the solute.

Curie (Ci) - A non-SI unit of radioactivity (disintegrations per unit time), equal to 3.7×10^{10} s^{-1}.

Curie temperature (T_C)* - For a ferromagnetic material, the critical temperature above which the material becomes paramagnetic. Also applied to the temperature at which the spontaneous polarization disappears in a ferroelectric solid. [1]

Cyanohydrins - Alcohols substituted by a cyano group, most commonly, but not limited to, examples having a CN and an OH group attached to the same carbon atom. They are formally derived from aldehydes or ketones by the addition of hydrogen cyanide. [5]

Cycloalkanes - Saturated monocyclic hydrocarbons (with or without side chains). See alicyclic compounds. Unsaturated monocyclic hydrocarbons having one endocyclic double or one triple bond are called cycloalkenes and cycloalkynes, respectively. [5]

Cyclotron resonance - The resonant absorption of energy from a system in which electrons or ions that are orbiting in a uniform magnetic field are subjected to radiofrequency or microwave radiation. The resonance frequency is given by $\nu = eH/2\pi m^* c$, where e is the elementary charge, H is the magnetic field strength, m^* is the effective mass of the charged particle, and c is the speed of light. The effect occurs in both solids (involving electrons or holes) and in low pressure gasses (involving ions)

Dalton (Da) - A name sometimes used in biochemistry for the unified atomic mass unit (u).

De Broglie wavelength - The wavelength associated with the wave representation of a moving particle, given by h/mv, where h is Planck's constant, m the particle mass, and v the velocity.

De Haas-Van Alphen effect - An effect observed in certain metals and semiconductors at low temperatures and high magnetic fields, characterized by a periodic variation of magnetic susceptibility with field strength.

Debye equation* - The relation between the relative permittivity (dielectric constant) ε_r, polarizability α, and permanent dipole moment μ in a dielectric material whose molecules are free to rotate. It takes the form

$$\frac{\varepsilon_r - 1}{\varepsilon_r + 2} = \frac{\rho N_A}{3M\varepsilon_0}\left(\alpha + \frac{\mu^2}{3kT}\right)$$

where ρ is density, N_A is Avogadro's number, M is molar mass, and ε_0 is the permittivity of a vacuum.

Debye length - In the Debye-Hückel theory of ionic solutions, the effective thickness of the cloud of ions of opposite charge which surrounds each given ion and shields the Coulomb potential produced by that ion.

Debye temperature (θ_D)* - In the Debye model of the heat capacity of a crystalline solid, $\theta_D = h\nu_D/k$, where h is Planck's constant, k is the Boltzmann constant, and ν_D is the maximum vibrational frequency the crystal can support. For $T << \theta_D$, the heat capacity is proportional to T^3.

Debye unit (D) - A non-SI unit of electric dipole moment used in molecular physics, equal to 3.335641×10^{-30} C m.

Debye-Waller factor (D) - The factor by which the intensity of a diffraction line is reduced because of lattice vibrations. [1]

Defect - Any departure from the regular structure of a crystal lattice. A Frenkel defect results when an atom or ion moves to an interstitial position and leaves behind a vacancy. A Schottky defect involves either a vacancy where the atom has moved to the surface or a structure where a surface atom has moved to an interstitial position.

Degree of polymerization - The number of monomeric units in a macromolecule or an oligomer molecule. [8]

Dendrite - A tree-like crystalline pattern often observed, for example, in ice crystals and alloys in which the crystal growth branches repeatedly.

Density (ρ)* - In the most common usage, mass density or mass per unit volume. More generally, the amount of some quantity (mass, charge, energy, etc.) divided by a length, area, or volume.

Density of states (N_E, ρ) - The number of one-electron states in an infinitesimal interval of energy, divided by the range of that interval and by volume. [1]

Dew point* - The temperature at which liquid begins to condense as the temperature of a gas mixture is lowered. In meteorology, it is the temperature at which moisture begins to condense on a surface in contact with the air.

Diamagnetism - A type of magnetism characterized by a negative magnetic susceptibility, so that the material, when placed in an external magnetic field, becomes weakly magnetized in the direction opposite to the field. This magnetization is independent of temperature.

Diazo compounds - Compounds having the divalent diazo group, $=N^+=N^-$, attached to a carbon atom, e.g., $CH_2=N_2$ diazomethane. [5]

Dielectric constant (ε)* - Ratio of the electric displacement in a medium to the electric field strength. Also called permittivity. [1]

Dienes - Compounds that contain two fixed double bonds (usually assumed to be between carbon atoms). Dienes in which the two double-bond units are linked by one single bond are termed conjugated. [5]

Differential scanning calorimetry (DSC) - See Techniques for Materials Characterization, page 12-1.

Differential thermal analysis (DTA) - See Techniques for Materials Characterization, page 12-1.

Diffusion* - The migration of atoms, molecules, ions, or other particles as a result of some type of gradient (concentration, temperature, etc.).

Diopter - A unit used in optics, formally equal to m^{-1}. It is used in expressing dioptic power, which is the reciprocal of the focal length of a lens.

Dipole moment, electric ($\boldsymbol{p}$,$\boldsymbol{\mu}$)* - For a distribution of equal positive and negative charge, the magnitude of the dipole moment vector is the positive charge multiplied by the distance between the centers of positive and negative charge distribution. The direction is given by the line from the center of negative charge to the center of positive charge.

Dipole moment, magnetic ($\boldsymbol{m}$,$\boldsymbol{\mu}$) - Formally defined in electromagnetic theory as a vector quantity whose vector product with the magnetic flux density equals the torque. The magnetic dipole generated by a current I flowing in a small loop of area A has a magnetic moment of magnitude IA. In atomic and nuclear physics, a magnetic moment is associated with the angular momentum of a particle; e.g., an electron with orbital angular momentum $\boldsymbol{l}$ exhibits a magnetic moment of $-e\boldsymbol{l}/2m_e$ where e is the elementary charge and m_e the mass of the electron. [1]

Disaccharides - Compounds in which two monosaccharides are joined by a glycosidic bond. [5]

Dislocation - An extended displacement of a crystal from a regular lattice. An edge dislocation results when one portion of the crystal has partially slipped with respect to the other, resulting in an extra plane of atoms extending through part of the crystal. A screw dislocation transforms successive atomic planes into the surface of a helix.

Dispersion - Splitting of a beam of light (or other electromagnetic radiation) of mixed wavelengths into the constituent wavelengths as a result of the variation of refractive index of the medium with wavelength.

Dissociation constant* - The equilibrium constant for a chemical reaction in which a compound dissociates into its constituent parts.

Dissociation energy (D_e)* - For a diatomic molecule, the difference between the energies of the free atoms at rest and the minimum in the potential energy curve. The term bond dissociation energy (D_0), which can be applied to polyatomic molecules as well, is used for the difference between the energies of the fragments resulting when a bond is broken and the energy of the original molecule in its lowest energy state. The term bond strength implies differences in enthalpy rather than energy.

Domain - A small region of a solid in which the magnetic or electric moments of the individual units (atoms, molecules, or ions) are aligned in the same direction.

Domain wall - The transition region between adjacent ferromagnetic domains, generally a layer with a thickness of a few hundred ångström units. Also called Bloch wall.

Doppler effect - The change in the apparent frequency of a wave (sound, light, or other) when the source of the wave is moving relative to the observer.

Dose equivalent (*H*) - The product of the absorbed dose of radiation at a point of interest in tissue and various modifying factors which depend on the type of tissue and radiation. [1]

Drift velocity - The velocity of charge carriers (electrons, ions, etc.) moving under the influence of an electric field in a medium which subjects the carriers to some frictional force.

Dyne (dyn) - A non-SI (cgs) unit of force, equal to 10^{-5} N.

Ebullioscopic constant (E_b)* - The constant that expresses the amount by which the boiling point T_b of a solvent is raised by a non-dissociating solute, through the relation $\Delta T_b = E_b\, m$, where m is the molality of the solute.

Eddy currents - Circulating currents set up in conducting bulk materials or sheets by varying magnetic fields.

Effinghausen effect - The appearance of a temperature gradient in a current carrying conductor that is placed in a transverse magnetic field. The direction of the gradient is perpendicular to the current and the field.

Eigenvalue - An allowed value of the constant a in the equation $Au = au$, where A is an operator acting on a function u (which is called an eigenfunction). In quantum mechanics, the outcome of any observation is an eigenvalue of the corresponding operator. Also called characteristic value.

Einstein - A non-SI unit used in photochemistry, equal to one mole of photons.

Einstein temperature (θ_V) - In the Einstein theory of the heat capacity of a crystalline solid, $\theta_V = h\nu/k$, where h is Planck's constant, k is the Boltzmann constant, and ν is the vibrational frequency of the crystal.

Einstein transition probability - A constant in the Einstein relation $A_{ij} + B_{ij}\rho$ for the probability of a transition between two energy levels i and j in a radiation field of energy density ρ. The A_{ij} coefficient describes the probability of spontaneous emission, while B_{ij} and B_{ji} govern the probability of stimulated emission and absorption, respectively ($B_{ij} = B_{ji}$).

Elastic limit - The greatest stress which a material is capable of sustaining without any permanent strain remaining after complete release of the stress. [10]

Elastic modulus - See Young's modulus.

Electric charge (*Q*) - The quantity of electricity; i.e., the property that controls interactions between bodies through electrical forces.

Electric current (*I*) - The charge passing through a circuit per unit time. [1]

Electric displacement (*D*) - A vector quantity whose magnitude equals the electric field strength multiplied by the permittivity of the medium and whose direction is the same as that of the field strength.

Electric field strength (*E*) - The force exerted by an electric field on a point charge divided by the electric charge. [1]

Electric potential (*V*) - A scalar quantity whose gradient is equal to the negative of the electric field strength.

Electrical conductance - See Conductance

Electrical resistance - See Resistance

Electrical resistivity - See Resistivity.

Electrochemical series* - An arrangement of reactions which produce or consume electrons in an order based on standard electrode potentials. A common arrangement places metals in decreasing order of their tendency to give up electrons.

Electrode potential* - The electromotive force of a cell in which the electrode on the left is the standard hydrogen electrode and that on the right is the electrode in question. [2]

Electrolysis - The decomposition of a substance as a result of passing an electric current between two electrodes immersed in the sample.

Electromotive force (emf) - The energy supplied by a source divided by the charge transported through the source. [1]

Electron* - An elementary particle in the family of leptons, with negative charge and spin of 1/2.

Electron affinity* - The energy difference between the ground state of a gas-phase atom or molecule and the lowest state of the corresponding negative ion.

Electron cyclotron resonance (ECR) - See Techniques for Materials Characterization, page 12-1.

Electron energy loss spectroscopy (EELS) - See Techniques for Materials Characterization, page 12-1.

Electron nuclear double resonance (ENDOR) - See Techniques for Materials Characterization, page 12-1.

Electron paramagnetic resonance (EPR) - See Techniques for Materials Characterization, page 12-1.

Electron probe microanalysis (EPMA) - See Techniques for Materials Characterization, page 12-1.

Electron spectroscopy for chemical analysis (ESCA) - See Techniques for Materials Characterization, page 12-1.

Electron spin (*s*) - The quantum number, equal to 1/2, that specifies the intrinsic angular momentum of the electron.

Electron stimulated desorption (ESD) - See Techniques for Materials Characterization, page 12-1.

Electron volt (eV)* - A non-SI unit of energy used in atomic and nuclear physics, equal to approximately 1.602177×10^{-19} J. The electron volt is defined as the kinetic energy acquired by an electron upon acceleration through a potential difference of 1 V. [1]

Electronegativity* - A parameter originally introduced by Pauling which describes, on a relative basis, the power of an atom or group of atoms to attract electrons from the same molecular entity. [3]

Electrophoresis - The motion of macromolecules or colloidal particles in an electric field. [3]

Emissivity (ε)* - Ratio of the radiant flux emitted per unit area to that of an ideal black body at the same temperature. Also called emittance. [1]

Emu - The electromagnetic system of units, based upon the cm, g, and s plus the emu of current (sometimes called the abampere).

Enantiomers - A chiral molecule and its non-superposable mirror image. The two forms rotate the plane of polarized light by equal amounts in opposite directions. Also called optical isomers.

Energy (*E,U*)* - The characteristic of a system that enables it to do work.

Energy gap* - In the theory of solids, the region between two energy bands, in which no bound states can occur.

Enols, alkenols - The term refers specifically to vinylic alcohols, which have the structure $HOCR'=CR_2$. Enols are tautomeric with aldehydes (R′ = H) or ketones (R′ not equal to H). [5]

Enthalpy (*H*)* - A thermodynamic function, especially useful when dealing with constant-pressure processes, defined by $H = E + PV$, where E is energy, P pressure, and V volume. [1]

Enthalpy of combustion* - The enthalpy change in a combustion reaction. Its negative is the heat released in combustion.

Enthalpy of formation, standard* - The enthalpy change for the reaction in which a substance is formed from its constituent elements, each in its standard reference state (normally refers to 1 mol, sometimes to 1 g, of the substance).

Enthalpy of fusion* - The enthalpy change in the transition from solid to liquid state.

Enthalpy of sublimation - The enthalpy change in the transition from solid to gas state.

Enthalpy of vaporization* - The enthalpy change in the transition from liquid to gas state.

Entropy (*S*)* - A thermodynamic function defined such that when a small quantity of heat dQ is received by a system at temperature T, the entropy of the system is increased by dQ/T, provided that no irreversible change takes place in the system. [1]

Entropy unit (e.u.) - A non-SI unit of entropy, equal to 4.184 J/K mol.

Ephemeris time - Time measured in tropical years from January 1, 1900.

Epoxy compounds - Compounds in which an oxygen atom is directly attached to two adjacent or non-adjacent carbon atoms of a carbon chain or ring system; thus cyclic ethers. [5]

Equation of continuity - Any of a class of equations that express the fact that some quantity (mass, charge, energy, etc.) cannot be created or destroyed. Such equations typically specify that the rate of increase of the quantity in a given region of space equals the net current of the quantity flowing into the region.

Equation of state* - An equation relating the pressure, volume, and temperature of a substance or system.

Equilibrium constant (*K*)* - For a chemical reaction $a\mathrm{A} + b\mathrm{B} \rightleftharpoons c\mathrm{C} + d\mathrm{D}$, the equilibrium constant is defined by:

$$K = \frac{a_{\mathrm{C}}{}^{c} \cdot a_{\mathrm{D}}{}^{d}}{a_{\mathrm{A}}{}^{a} \cdot a_{\mathrm{B}}{}^{b}}$$

where a_i is the activity of component i. To a certain approximation, the activities can be replaced by concentrations. The equilibrium constant is related to $\Delta_r G°$, the standard Gibbs energy change in the reaction, by $RT \ln K = -\Delta_r G°$.

Equivalent conductance - See Conductivity, electrical

Erg (erg) - A non-SI (cgs) unit of energy, equal to 10^{-7} J.

Esters - Compounds formally derived from an oxoacid RC(=O)(OH) and an alcohol, phenol, heteroarenol, or enol by linking, with formal loss of water from an acidic hydroxy group of the former and a hydroxy group of the latter. [5]

Esu - The electrostatic system of units, based upon the cm, g, and s plus the esu of charge (sometimes called the statcoulomb or franklin).

Ethers - Compounds with formula ROR, where R is not equal to H. [5]

Euler number (*Eu*) - A dimensionless quantity used in fluid mechanics, defined by $Eu = \Delta p/\rho v^2$, where p is pressure, ρ is density, and v is velocity. [2]

Eutectic - The point on a two-component solid-liquid phase diagram which represents the lowest melting point of any possible mixture. A liquid having the eutectic composition will freeze at a single temperature without change of composition.

Excitance (*M*) - Radiant energy flux leaving an element of a surface divided by the area of that element. [1]

Exciton - A localized excited state consisting of a bound electron-hole pair in a molecular or ionic crystal. The exciton can propagate through the crystal.

Exosphere - The outermost part of the earth's atmosphere, beginning at about 500 to 1000 km above the surface. It is characterized by densities so low that air molecules can escape into outer space.

Expansion coefficient - See thermal expansion coefficient.

Extended electron energy loss fine structure (EXELFS) - See Techniques for Materials Characterization, page 12-1.

Extended x-ray absorption fine structure (EXAFS) - See Techniques for Materials Characterization, page 12-1.

Extinction coefficient - See Absorption coefficient, molar

F-Center - See Color center

Fahrenheit temperature (°F) - The temperature scale based on the assignment of 32°F = 0°C and a temperature interval of °F =(5/9)°C; i.e., t/°F = (9/5)t/°C + 32.

Farad (F)* - The SI unit of electric capacitance, equal to C/V. [1]

Faraday constant (*F*)* - The electric charge of 1 mol of singly charged positive ions; i.e., $F = N_A e$, where N_A is Avogadro's constant and e is the elementary charge. [1]

Faraday effect* - The rotation of the plane of plane-polarized light by a medium placed in a magnetic field parallel to the direction of the light beam. The effect can be observed in solids, liquids, and gasses.

Fatty acids - Aliphatic monocarboxylic acids derived from or contained in esterified form in an animal or vegetable fat, oil, or wax. Natural fatty acids commonly have a chain of 4 to 28 carbons (usually unbranched and even-numbered), which may be saturated or unsaturated. By extension, the term is sometimes used to embrace all acyclic aliphatic carboxylic acids. [5]

Fermat's principle - The law that a ray of light traversing one or more media will follow a path which minimizes the time required to pass between two given points.

Fermi (f) - Name sometimes used in nuclear physics for the femtometer.

Fermi level - The highest energy of occupied states in a solid at zero temperature. Sometimes called Fermi energy. The Fermi surface is the surface in momentum space formed by electrons occupying the Fermi level.

Fermi resonance - An effect observed in vibrational spectroscopy when an overtone of one fundamental vibration closely coincides in energy with another fundamental of the same symmetry species. It leads to a splitting of vibrational bands.

Fermi-Dirac distribution - A modification of the Boltzmann distribution which takes into account the Pauli exclusion principle. The number of particles of energy E is proportional to $[e^{(E-\mu)/kT}+1]^{-1}$, where μ is a normalization constant, k the Boltzmann constant, and T the temperature. The distribution is applicable to a system of fermions.

Fermion - A particle that obeys Fermi-Dirac statistics. Specifically, any particle with spin equal to an odd multiple of 1/2. Examples are the electron, proton, neutron, muon, etc.

Ferrimagnetism* - A type of magnetism in which the magnetic moments of atoms in a solid are ordered into two nonequivalent sublattices with unequal magnetic moments, leading to a nonzero magnetic susceptibility.

Ferrite - A ferrimagnetic material of nominal formula MFe_2O_4, where M is a divalent metal; widely used in microwave switches and other solid state devices.

Ferroelectricity* - The retention of electric polarization by certain materials after the external field that produced the polarization has been removed.

Ferromagnetism* - A type of magnetism in which the magnetic moments of atoms in a solid are aligned within domains which can in turn be aligned with each other by a weak magnetic field. Some ferromagnetic materials can retain their magnetization when the external field is removed, as long as the temperature is below a critical value, the Curie temperature. They are characterized by a large positive magnetic susceptibility.

Fick's law - The statement that the flux J of a diffusing substance is proportional to the concentration gradient, i.e., $J = -D(\mathrm{d}c/\mathrm{d}x)$, where D is called the diffusion coefficient.

Field - A mathematical construct which describes the interaction between particles resulting from gravity, electromagnetism, or other physical phenomena. In classical physics a field is described by equations. Quantum field theory introduces operators to represent the physical observables.

Field emission microscopy (FEM) - See Techniques for Materials Characterization, page 12-1.

Field ion microscopy (FIM) - See Techniques for Materials Characterization, page 12-1.

Fine structure - The splitting in spectral lines that results from interactions of the electron spin with the orbital angular momentum.

Fine structure constant (α)* - Defined as $e^2/2hc\varepsilon_0$, where e is the elementary charge, h Planck's constant, c the speed of light, and ε_0 the permittivity of a vacuum. It is a measure of the strength of the electromagnetic interaction between particles.

First radiation constant (c_1)* - Constant ($= 2\pi hc^2$) in the equation for the radiant excitance M_λ of a black body:

$$M_\lambda = \frac{c_1 \lambda^{-5} \Delta\lambda}{e^{c_2/\lambda T} - 1}$$

where λ is the wavelength, T is the temperature, and $c_2 = hc/k$ is the second radiation constant.

Flash point - The lowest temperature at which vapors above a volatile combustible substance will ignite in air when exposed to a flame. [10]

Fluence (F) - Term used in photochemistry to specify the energy per unit area delivered in a given time interval, for example by a laser pulse. [2]

Fluorocarbons - Compounds consisting solely of fluorine and carbon. [5]

Fluxoid - The quantum of magnetic flux in superconductivity theory, equal to $hc/2e$, where h is Planck's constant, c the velocity of light, and e the elementary charge.

Force (F) - The rate of change of momentum with time. [1]

Force constants (f, k)* - In molecular vibrations, the coefficients in the expression of the potential energy in terms of atom displacements from their equilibrium positions. In a diatomic molecule, $f = \mathrm{d}^2V/\mathrm{d}r^2$, where $V(r)$ is the potential energy and r is the interatomic distance. [2]

Fourier number (Fo) - A dimensionless quantity used in fluid mechanics, defined by $Fo = at/l^2$, where a is thermal diffusivity, t is time, and l is length. [2]

Fourier transform infrared spectroscopy (FTIR) - A technique for obtaining an infrared spectrum by use of an interferometer in which the path length of one of the beams is varied. A Fourier transformation of the resulting interferogram yields the actual spectrum. The technique is also used for NMR and other types of spectroscopy.

Fractals - Geometrical objects that are self-similar under a change of scale; i.e., they appear similar at all levels of magnification. They can be considered to have fractional dimensionality. Examples occur in diverse fields such as geography (rivers and shorelines), biology (trees), and solid state physics (amorphous materials).

Franck-Condon principle - An important principle in molecular spectroscopy which states that the nuclei in a molecule remain essentially stationary while an electronic transition is taking place. The physical interpretation rests on the fact that the electrons move much more rapidly than the nuclei because of their much smaller mass.

Franklin (Fr) - Name sometimes given to the unit of charge in the esu system.

Fraunhofer diffraction - Diffraction of light in situations where the source and observation point are so far removed that the wave surfaces may be considered planar.

Fraunhofer lines - Sharp absorption lines in the spectrum of sunlight, caused by absorption of the solar blackbody radiation by atoms near the sun's surface.

Free radical - See Radicals. The term "free radical" is often used more broadly for molecules that have a paramagnetic ground state (e.g., O_2) and sometimes for any transient or highly reactive molecular species.

Freezing point - See Melting point

Frequency (ν)* - Number of cycles of a periodic phenomenon divided by time. [1]

Fresnel diffraction - Diffraction of light in a situation where the source and observation point are sufficiently close together that the curvature of the wave surfaces must be taken into account.

Froude number (Fr) - A dimensionless quantity used in fluid mechanics, defined by $Fr = v/(lg)^{1/2}$, where v is velocity, l is length, and g is acceleration due to gravity. [2]

Fugacity (f_B) - For a gas mixture, the fugacity of component B is defined as the absolute activity λ_B times the limit, as the pressure p approaches zero at constant temperature, of p_B/λ_B. [2]

Fullerenes - Compounds composed solely of an even number of carbon atoms, which form a cage-like fused-ring polycyclic system with twelve five-membered rings and the rest six-membered rings. The archetypal example is [60]fullerene, where the atoms and bonds delineate a truncated icosahedron. The term has been broadened to include any closed cage structure consisting entirely of three-coordinate carbon atoms. [5]

Fulvalenes - The hydrocarbon fulvalene and its derivatives formed by substitution (and by extension, analogues formed

by replacement of one or more carbon atoms of the fulvalene skeleton by a heteroatom). [5]

Fulvenes - The hydrocarbon fulvene and its derivatives formed by substitution (and by extension, analogues formed by replacement of one or more carbon atoms of the fulvene skeleton by a heteroatom). [5]

Fundamental vibrational frequencies* - In molecular spectroscopy, the characteristic vibrational frequencies obtained when the vibrational energy is expressed in normal coordinates. They determine the primary features of the infrared and Raman spectra of the molecule.

γ - Name sometimes used for microgram.

γ-rays* - Electromagnetic radiation (photons) with energy greater than about 0.1 MeV (wavelength less than about 1 pm).

***g*-Factor of the electron* -** The proportionality factor in the equation relating the magnetic moment μ of an electron to its total angular momentum quantum number *J*, i.e., $\mu = -g\mu_B J$, where μ_B is the Bohr magneton. Also called Landé factor.

Gal - A non-SI unit of acceleration, equal to 0.01 m/s. Also called galileo.

Gallon (US) - A unit of volume equal to 3.785412 L.

Gallon (UK, Imperial) - A unit of volume equal to 4.546090 L.

Gauss (G) - A non-SI unit of magnetic flux density (*B*) equal to 10^{-4} T.

Gaussian system of units - A hybrid system used in electromagnetic theory, which combines features of both the esu and emu systems.

Gel - A colloidal system with a finite, but usually rather small, yield stress (the sheer stress at which yielding starts abruptly). [3]

Genetic code* - The set of relations between each of the 64 codons of DNA and a specific amino acid (or other genetic instruction).

Gibbs energy (*G*)* - An important function in chemical thermodynamics, defined by $G = H\text{-}TS$, where *H* is the enthalpy, *S* the entropy, and *T* the thermodynamic temperature. Sometimes called Gibbs free energy and, in older literature, simply "free energy". [2]

Gibbs phase rule - The relation $F = C - P + 2$, where *C* is the number of components in a mixture, *P* is the number of phases, and *F* is the degrees of freedom, i.e., the number of intensive variables that can be changed independently without affecting the number of phases.

Glass transition temperature* - The temperature at which an amorphous polymer is transformed, in a reversible way, from a viscous or rubbery condition to a hard and relatively brittle one. [10]

Glow discharge mass spectroscopy (GDMS) - See Techniques for Materials Characterization, page 12-1.

Gluon - A hypothetical particle postulated to take part in the binding of quarks, in analogy to the role of the photon in electromagnetic interactions.

Glycerides - Esters of glycerol (propane-1,2,3-triol) with fatty acids, widely distributed in nature. They are by long-established custom subdivided into triglycerides, 1,2- or 1,3-diglycerides, and 1- or 2-monoglycerides, according to the number and positions of acyl groups. [5]

Glycols - Dihydric alcohols in which two hydroxy groups are on different carbon atoms, usually but not necessarily adjacent. Also called diols. [5]

Grain (gr) - A non-SI unit of mass, equal to 64.79891 mg.

Grain boundary - The interface between two regions of different crystal orientation.

Grashof number (*Gr*) - A dimensionless quantity used in fluid mechanics, defined by $Gr = l^3 g\alpha\Delta T\rho^2/\eta^2$, where *T* is temperature, ρ is density, *l* is length, η is viscosity, α is cubic expansion coefficient, and *g* is acceleration of gravity. [2]

Gravitational constant (*G*)* - The universal constant in the equation for the gravitational force between two particles, $F = Gm_1m_2/r^2$, where *r* is the distance between the particles and m_1 and m_2 are their masses. [1]

Gray (Gy)* - The SI unit of absorbed dose of radiation, equal to J/kg. [1]

Gregorian calendar - The modification of the Julian calendar introduced in 1582 by Pope Gregory XII which specified that a year divisible by 100 is a leap year only if divisible by 400.

Grignard reagents - Organomagnesium halides, RMgX, having a carbon-magnesium bond (or their equilibrium mixtures in solution with $R_2Mg + MgX_2$). [5]

Gruneisen parameter (γ) - Defined by $\gamma = \alpha_V/\kappa\, c_V\, \rho$, where α_V is the cubic thermal expansion coefficient, κ is the isothermal compressibility, c_V is the specific heat capacity at constant volume, and ρ is the mass density. γ is independent of temperature for most crystalline solids. [1]

Gyromagnetic ratio (γ) - Ratio of the magnetic moment of a particle to its angular momentum. Also called magnetogyric ratio.

Hadron - Any elementary particle that can take part in the strong interaction. Hadrons are subdivided into baryons, with odd half integer spins, and mesons, which have zero or integral spin.

Hall effect* - The development of a transverse potential difference *V* in a conducting material when subjected to a magnetic field *H* perpendicular to the direction of the current. The potential difference is given by $V = R_H BJt$, where *B* is the magnetic induction, *J* the current density, *t* the thickness of the specimen in the direction of the potential difference, and R_H is called the Hall coefficient.

Halocarbon - A compound containing no elements other than carbon, hydrogen, and one or more halogens. In common practice, the term is used mainly for compounds of no more than four or five carbon atoms.

Halogens - The elements F, Cl, Br, I, and At. Compounds of these elements are called halogenides or halides. [7]

Hamiltonian (*H*) - An expression for the total energy of a mechanical system in terms of the momenta and positions of constituent particles. In quantum mechanics, the Hamiltonian operator appears in the eigenvalue equation $H\psi = E\psi$, where *E* is an energy eigenvalue and ψ the corresponding eigenfunction.

Hardness* - The resistance of a material to deformation, indentation, or scratching. Hardness is measured on various scales, such as Mohs, Brinell, Knoop, Rockwell, and Vickers. [10]

Hartmann number (*Ha*) - A dimensionless quantity used in plasma physics, defined by $Ha = Bl(\kappa/\eta)^{1/2}$, where *B* is magnetic flux density, *l* is length, κ is electric conductivity, and η is viscosity. [2]

Hartree (E_h)* - An energy unit used in atomic and molecular science, equal to approximately $4.3597482 \times 10^{-18}$ J.

Hartree-Fock method - A iterative procedure for solving the Schrödinger equation for an atom or molecule in which the equation is solved for each electron in an initial assumed po-

tential from all the other electrons. The new potential that results is used to repeat the calculation and the procedure continued until convergence is reached. Also called self-consistent field (SCF) method.

Heat capacity* - Defined in general as dQ/dT, where dQ is the amount of heat that must be added to a system to increase its temperature by a small amount dT. The heat capacity at constant pressure is $C_p = (\partial H/\partial T)_p$; that at constant volume is $C_V = (\partial E/\partial T)_V$, where H is enthalpy, E is internal energy, p is pressure, V is volume, and T is temperature. An upper case C normally indicates the molar heat capacity, while a lower case c is used for the specific (per unit mass) heat capacity. [1]

Heat of formation, vaporization, etc. - See corresponding terms under Enthalpy.

Hectare (ha) - A unit of area equal to 10^4 m^2. [1]

Heisenberg uncertainty principle - The statement that two observable properties of a system that are complementary, in the sense that their quantum-mechanical operators do not commute, cannot be specified simultaneously with absolute precision. An example is the position and momentum of a particle; according to this principle, the uncertainties in position Δq and momentum Δp must satisfy the relation $\Delta p \Delta q \geq h/4\pi$, where h is Planck's constant.

Heitler-London model - An early quantum-mechanical model of the hydrogen atom which introduced the concept of the exchange interaction between electrons as the primary reason for stability of the chemical bond.

Helicon - A low-frequency wave generated when a metal at low temperature is exposed to a uniform magnetic field and a circularly polarized electric field.

Helmholz energy (*A*) - A thermodynamic function defined by $A = E - TS$, where E is the energy, S the entropy, and T the thermodynamic temperature. [2]

Hemiacetals - Compounds having the general formula $R_2C(OH)OR'$ (R′ not equal to H). [5]

Henry (H)* - The SI unit of inductance, equal to Wb/A. [1]

Henry's law * - An expression which applies to an ideal dilute solution in which one or more gasses are dissolved, viz., $p_i = H_i x_i$, where p_i is the partial pressure of component i above the solution, x_i is its mole fraction in the solution, and H_i is the Henry's law constant (a characteristic of the given gas and solvent, as well as the temperature).

Hermitian operator - An operator A that satisfies the relation $\int u_m^* A u_n \, dx = (\int u_n^* A u_m \, dx)^*$, where * indicates the complex conjugate. The eigenvalues of Hermitian operators are real, and eigenfunctions belonging to different eigenvalues are orthogonal.

Hertz (Hz) - The SI unit of frequency, equal to s^{-1}. [1]

Heterocyclic compounds - Cyclic compounds having as ring members atoms of at least two different elements, e.g., quinoline, 1,2-thiazole, bicyclo[3.3.1]tetrasiloxane. [5]

Heusler alloys - Alloys of manganese, copper, aluminum, nickel, and sometimes other metals which find important uses as permanent magnets.

Holography - A technique for creating a three-dimensional image of a object by recording the interference pattern between a light beam diffracted from the object and a reference beam. The image can be reconstructed from this pattern by a suitable optical system.

Homopolymer - A polymer derived from one species of (real, implicit, or hypothetical) monomer. [8]

Hooke's law - The statement that the ratio of stress to strain is a constant in a totally elastic medium.

Horse power - A non-SI unit of energy, equal to approximately 746 W.

Hubble constant - The ratio of the recessional velocity of an extragalactic object to the distance of that object. Its value is about 2×10^{-18} s^{-1}.

Huckel theory - A simple approximation for calculating the energy of conjugated molecules in which only the resonance integrals between neighboring bonds are considered. Also called CNDO method (complete neglect of differential overlap).

Hume-Rothery rules - A set of empirical rules for predicting the occurrence of solid solutions in metallic systems. The rules involve size, crystal structure, and electronegativity.

Hund's rules - A series of rules for predicting the sequence of energy states in atoms and molecules. One of the important results is that when two electrons exist in different orbitals, the state with their spins parallel (triplet state) lies at lower energy than the state with antiparallel spins (singlet).

Hydrazines - Hydrazine (diazane), H_2NNH_2, and its hydrocarbyl derivatives. When one or more substituents are acyl groups, the compound is a hydrazide. [5]

Hydrocarbon - A compound containing only carbon and hydrogen. [5]

Hydrolysis - A reaction occurring in water in which a chemical bond is cleaved and a new bond formed with the oxygen atom of water.

Hyperfine structure - Splitting of energy levels and spectral lines into several closely spaced components as a result of interaction of nuclear spin angular momentum with other angular momenta in the atom or molecule.

Hysteresis* - An irreversible response of a system (parameter A) as a function of an external force (parameter F), usually symmetric with respect to the origin of the A vs. F graph after the initial application of the force. A common example is magnetic induction vs. magnetic field strength in a ferromagnet.

Ideal gas law - The equation of state $pV = RT$, which defines an ideal gas, where p is pressure, V molar volume, T temperature, and R the molar gas constant.

Ideal solution - A solution in which solvent-solvent and solvent-solute interactions are identical, so that properties such as volume and enthalpy are exactly additive. Ideal solutions follow Raoult's law, which states that the vapor pressure p_i of component i is $p_i = x_i p_i^*$, where x_i is the mole fraction of component i and p_i^* the vapor pressure of the pure substance i.

Ignition temperature* - The lowest temperature at which combustion of a material will occur spontaneously under specified conditions. Sometimes called autoignition temperature, kindling point. [10]

Imides - Diacyl derivatives of ammonia or primary amines, especially those cyclic compounds derived from diacids. Also used for salts having the anion RN_2^-. [5]

Impedence (*Z*) - The complex representation of potential difference divided by the complex representation of current. In terms of reactance X and resistance R, the impedance is given by $Z = R + iX$. [1]

Index of refraction (*n*)* - For a non-absorbing medium, the ratio of the velocity of electromagnetic radiation *in vacuo* to the phase velocity of radiation of a specified frequency in the medium. [1]

Inductance - The ratio of the electromagnetic force induced in a coil by a current to the rate of change of the current.

Inductive coupled plasma mass spectroscopy (ICPMS) - See Techniques for Materials Characterization, page 12-1.

Inertial defect - In molecular spectroscopy, the quantity I_c-I_a-I_b for a molecule whose equilibrium configuration is planar, where I_a, I_b, and I_c are the effective principal moments of inertia. The inertial defect for a rigid planar molecule would be zero, but vibration-rotation interactions in a real molecule lead to a positive inertial defect.

Insulator - A material in which the highest occupied energy band (valence band) is completely filled with electrons, while the next higher band (conduction band) is empty. Solids with an energy gap of 5 eV or more are generally considered as insulators at room temperature. Their conductivity is less than 10^{-6} S/m and increases with temperature.

Intercalation compounds - Compounds resulting from reversible inclusion, without covalent bonding, of one kind of molecule in a solid matrix of another compound, which has a laminar structure. The host compound, a solid, may be macromolecular, crystalline, or amorphous. [5]

International System of Units (SI)* - The unit system adopted by the General Conference on Weights and Measures in 1960. It consists of seven base units (meter, kilogram, second, ampere, kelvin, mole, candela), plus derived units and prefixes. [1]

International Temperature Scale (ITS-90)* - The official international temperature scale adopted in 1990. It consists of a set of fixed points and equations which enable the thermodynamic temperature to be determined from operational measurements. [9]

Ion - An atomic or molecular particle having a net electric charge. [3]

Ion exchange - A process involving the adsorption of one or several ionic species accompanied by the simultaneous desorption (displacement) of one or more other ionic species. [3]

Ion neutralization spectroscopy (INS) - See Techniques for Materials Characterization, page 12-1.

Ionic strength (*I*) - A measure of the total concentration of ions in a solution, defined by $I = 1/2\Sigma_i z_i^2 m_i$, where z_i is the charge of ionic species i and m_i is its molality. For a 1-1 electrolyte at molality m, $I = m$.

Ionization constant* - The equilibrium constant for a reaction in which a substance in solution dissociates into ions.

Ionization potential* - The minimum energy required to remove an electron from an isolated atom or molecule (in its vibrational ground state) in the gaseous phase. More properly called ionization energy. [3]

Irradiance (*E*) - The radiant energy flux incident on an element of a surface, divided by the area of that element. [1]

Isentropic process - A thermodynamic process in which the entropy of the system does not change.

Ising model - A model describing the coupling between two atoms in a ferromagnetic lattice, in which the interaction energy is proportional to the negative of the product of the spin components along a specified axis.

Isobar - A line connecting points of equal pressure on a graphical representation of a physical system.

Isochore - A line or surface of constant volume on a graphical representation of a physical system.

Isoelectric point* - The pH of a solution or dispersion at which the net charge on the macromolecules or colloidal particles is zero. In electrophoresis there is no motion of the particles in an electric field at the isoelectric point.

Isomers - In chemistry, compounds that have identical molecular formulas but differ in the nature or sequence of bonding of their atoms or in the arrangement of their atoms in space. In physics, nuclei of the same atomic number Z and mass number A but in different energy states. [3]

Isomorphs - Substances of different chemical nature but having the same crystal structure.

Isotactic macromolecule - A tactic macromolecule, essentially comprising only one species of repeating unit which has chiral or prochiral atoms in the main chain in a unique arrangement with respect to its adjacent constitutional units. [8]

Isotherm - A line connecting points of equal temperature on a graphical representation of a physical system.

Isothermal process - A thermodynamic process in which the temperature of the system does not change.

Isotones - Nuclides having the same neutron number N but different atomic number Z. [3]

Isotopes - Two or more nuclides with the same atomic number Z but different mass number A. The term is sometimes used synonymously with nuclide, but it is preferable to reserve the word nuclide for a species of specific Z and A. [3]

Jahn-Teller effect - An interaction of vibrational and electronic motions in a nonlinear molecule which removes the degeneracy of certain electronic energy levels. It can influence the spectrum, crystal structure, and magnetic properties of the substance.

Johnson noise - Electrical noise generated by random thermal motion of electrons in a conductor or semiconductor. Also called thermal noise.

Josephson effect - The tunneling of electron pairs through a thin insulating layer which separates two superconductors. When a potential difference is applied to the superconductors, an alternating current is generated whose frequency is precisely proportional to the potential difference. This effect has important applications in metrology and determination of fundamental physical constants.

Joule (J)* - The SI unit of energy, equal to N m. [1]

Joule-Thomson coefficient (μ) - A parameter which describes the temperature change when a gas expands adiabatically through a nozzle from a high pressure to a low pressure region. It is defined by $\mu = (\partial T/\partial p)_H$, where H is enthalpy.

Julian calendar - The calendar introduced by Julius Caeser in 46 B.C. which divided the year into 365 days with a leap year of 366 days every fourth year.

Julian date (JD) - The number of days elapsed since noon Greenwich Mean Time on January 1, 4713 B.C. Thus January 1, 2000, 0h (midnight) will be JD 2,451,543.5. This dating system was introduced by Joseph Scaliger in 1582.

Kaon - One of the elementary particles in the family of mesons. Kaons have a spin of zero and may be neutral or charged.

Kelvin (K)* - The SI base unit of thermodynamic temperature. [1]

Kepler's laws - The three laws of planetary motion, which established the elliptical shape of planetary orbits and the relation between orbital dimensions and the period of rotation.

Kerr effect* - An electrooptical effect in which birefringence is induced in a liquid or gas when a strong electric field is applied perpendicular to the direction of an incident light beam. The Kerr constant k is given by n_1-$n_2 = k\lambda E^2$, where λ is the wavelength, E is the electric field strength, and n_1 and n_2 are the indices of refraction of the ordinary and extraordinary rays, respectively.

Ketenes - Compounds in which a carbonyl group is connected by a double bond to an alkylidene group: $R_2C{=}C{=}O$. [5]

Ketones - Compounds in which a carbonyl group is bonded to two carbon atoms: $R_1R_2C{=}O$ (neither R may be H). [5]

Kilogram (kg)* - The SI base unit of mass. [1]

Kinetic energy (E_k, T) - The energy associated with the motion of a system of particles in a specified reference frame. For a single particle of mass m moving at velocity v, $E_k = 1/2mv^2$.

Kirchhoff's laws - Basic rules for electric circuits, which state (a) the algebraic sum of the currents at a network node is zero and (b) the algebraic sum of the voltage drops around a closed path is zero.

Klein-Gordon equation - A relativistic extension of the Schrödinger equation.

Klein-Nishima formula - An expression for the scattering cross section of a photon by an unbound electron, based upon the Dirac electron theory.

Knight shift - The change in magnetic resonance frequency of a nucleus in a metal relative to the same nucleus in a diamagnetic solid. The effect is due to the polarization of the conduction electrons in the metal.

Knudsen number (*Kn*) - A dimensionless quantity used in fluid mechanics, defined by $Kn = \lambda/l$, where λ is mean free path and l is length. [2]

Kondo effect - A large increase in electrical resistance observed at low temperatures in certain dilute alloys of a magnetic metal in a nonmagnetic material.

Kramers-Kronig relation - A set of equations relating the real and imaginary parts of the index of refraction of a medium

Lactams - Cyclic amides of amino carboxylic acids, having a 1-azacycloalkan-2-one structure, or analogues having unsaturation or heteroatoms replacing one or more carbon atoms of the ring. [5]

Lactones - Cyclic esters of hydroxy carboxylic acids, containing a 1-oxacycloalkan-2-one structure, or analogues having unsaturation or heteroatoms replacing one or more carbon atoms of the ring. [5]

Lagrangian function (*L*) - A function used in classical mechanics, defined as the kinetic energy minus the potential energy for a system of particles.

Lamb shift - The small energy difference between the $^2S_{1/2}$ and $^2P_{1/2}$ levels in the hydrogen atom, which results from interactions between the electron and the radiation field.

Laminar flow - Smooth, uniform, non-turbulent flow of a gas or liquid in parallel layers, with little mixing between layers. It is characterized by small values of the Reynolds number.

Landé *g*-factor - See *g*-Factor of the electron

Langevin function - The mathematical function $L(x) = (e^x+e^{-x})/(e^x-e^{-x})-1/x$, which occurs in the expression for the average dipole moment of a group of rotating polar molecules in an electric field: $\mu_{av} = \mu L(\mu E/kT)$, where μ is the electric dipole moment of a single molecule, E is the electric field strength, k is the Boltzmann constant, and T is the temperature.

Lanthanides - The elements of atomic number 57 through 71, which share common chemical properties: La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu. [7]

Larmor frequency (ν_L) - The precession frequency of a magnetic dipole in an applied magnetic field. In particular, a nucleus in a magnetic field of strength B has a Larmor frequency of $\gamma B/2\pi$, where γ is the magnetogyric ratio of the nucleus.

Laser* - A device in which an optical cavity is filled with a medium where a population inversion can be produced by some means. When the resonant frequency of the cavity bears the proper relation to the separation of the inverted energy levels, stimulated emission occurs, producing a highly monochromatic, coherent beam of light.

Laser ionization mass spectroscopy (LIMS) - See Techniques for Materials Characterization, page 12-1.

Lattice constants* - Parameters specifying the dimensions of a unit cell in a crystal lattice, specifically the lengths of the cell edges and the angles between them.

Lattice energy* - The energy per ion pair required to separate completely the ions in a crystal lattice at a temperature of absolute zero.

Laue diagram - A diffraction pattern produced when an x-ray beam passes through a thin slice of a crystal and impinges on a detector behind the crystal.

Lenz's law - The statement that the current induced in a circuit by a change in magnetic flux is so directed as to oppose the change in flux

Leonard-Jones potential - A simple but useful function for approximating the interaction between two neutral atoms or molecules separated by a distance r by writing the potential energy as $U(r) = 4\varepsilon\{(r_0/r)^{12} - (r_0/r)^6\}$, where ε and r_0 are adjustable parameters. In this form the depth of the potential well is ε and the minimum occurs at $2^{1/6}r_0$. The $(1/r)^{12}$ term is often replaced by other powers of $1/r$.

Lepton - One of the class of elementary particles that do not take part in the strong interaction. Included are the electron, muon, and neutrino. All leptons have a spin of 1/2.

Lewis number (*Le*) - A dimensionless quantity used in fluid mechanics, defined by $Le = a/D$, where a is thermal diffusivity and D is diffusion coefficient. [2]

Ligand field theory - A description of the structure of crystals containing a transition metal ion surrounded by nonmetallic ions (ligands). It is based on construction of molecular orbitals involving the *d*-orbitals of the central metal ion and combinations of atomic orbitals of the ligands.

Light year (l.y.) - A unit of distance used in astronomy, defined as the distance light travels in one year in a vacuum. Its approximate value is 9.46073×10^{15} m.

Lignins - Macromolecular constituents of wood related to lignans, composed of phenolic propylbenzene skeletal units, linked at various sites and apparently randomly. [5]

Ligroin - The petroleum fraction consisting mostly of C_7 and C_8 hydrocarbons and boiling in the range 90-140°C; commonly used as a laboratory solvent.

Lipids - A loosely defined term for substances of biological origin that are soluble in nonpolar solvents. They consist of saponifiable lipids, such as glycerides (fats and oils) and phospholipids, as well as nonsaponifiable lipids, principally steroids. [5]

Lipoproteins - Clathrate complexes consisting of a lipid enwrapped in a protein host without covalent binding, in such a way that

the complex has a hydrophilic outer surface consisting of all the protein and the polar ends of any phospholipids. [5]

Liter (L)* - A synonym for cubic decimeter. [1]

Lithosphere* - The outer layer of the solid earth, extending from the base of the mantle to the surface of the crust.

Lorentz contraction - The reduction in length of a moving body in the direction of motion, given by the factor $(1-v^2/c^2)^{1/2}$, where v is the velocity of the body and c the velocity of light. Also known as the FitzGerald-Lorentz contraction.

Lorentz force - The force exerted on a point charge Q moving at velocity $\boldsymbol{v}$ in the presence of external fields $\boldsymbol{E}$ and $\boldsymbol{B}$. It is given (in SI units) by $\boldsymbol{F} = Q(\boldsymbol{E} + \boldsymbol{v} \times \boldsymbol{B})$.

Loss angle (δ) - For a dielectric material in an alternating electromagnetic field, δ is the phase difference between the current and the potential difference. The function tan δ is a measure of the ratio of the power dissipated in the dielectric to the power stored.

Low energy electron diffraction (LEED) - See Techniques for Materials Characterization, page 12-1.

Lumen (lm)* - The SI unit of luminous flux, equal to cd sr. [1]

Luminous flux (Φ) - The intensity of light from a source multiplied by the solid angle. The SI unit is lumen. [1]

Lux (lx)* - The SI unit of illuminance, equal to cd sr m^{-2}. [1]

Lyddane-Sachs-Teller relation - A relation between the phonon frequencies and dielectric constants of an ionic crystal which states that $(\omega_T/\omega_L)^2 = \varepsilon(\infty)/\varepsilon(0)$, where ω_T is the angular frequency of transverse optical phonons, ω_L that of longitudinal optical phonons, $\varepsilon(0)$ is the static dielectric constant, and $\varepsilon(\infty)$ the dielectric constant at optical frequencies.

Lyman series - The series of lines in the spectrum of the hydrogen atom which corresponds to transitions between the ground state (principal quantum number $n = 1$) and successive excited states. The wavelengths are given by $1/\lambda = R_H(1-1/n^2)$, where $n = 2,3,4,\ldots$ and R_H is the Rydberg constant for hydrogen. The first member of the series ($n = 1 \leftrightarrow 2$), which is often called the Lyman-α line, falls at a wavelength of 1216 Å, and the series converges at 912 Å, the ionization limit of hydrogen.

Mach number (*Ma*) - A dimensionless quantity used in fluid mechanics, defined by $Ma = v/c$, where v is velocity and c is the speed of sound. [2]

Macromolecule - A molecule of high relative molecular mass (molecular weight), the structure of which essentially comprises the multiple repetition of units derived, actually or conceptually, from molecules of low relative molecular mass [8]

Madelung constant* - A constant characteristic of a particular crystalline material which gives a measure of the electrostatic energy binding the ions in the crystal.

Magnetic field strength (*H*) - An axial vector quantity, the curl of which is equal to the current density, including the displacement current. [1]

Magnetic induction (*B*) - An axial vector quantity such that the force exerted on an element of current is equal to the vector product of this element and the magnetic induction. [1]

Magnetic moment - See Dipole moment, magnetic.

Magnetic susceptibility (χ_m, κ)* - Defined by $\chi_m = (\mu-\mu_0)/\mu_0$, where μ is the permeability of the medium and μ_0 the permeability of a vacuum. [1]

Magnetization (*M*) - Defined by $M = (B/\mu_0)-H$, where B is magnetic induction, H magnetic field strength, and μ_0 the permeability of a vacuum. [1]

Magnetogyric ratio (γ) - Ratio of the magnetic moment of a particle to its angular momentum. Also called gyromagnetic ratio.

Magneton - See Bohr magneton, Nuclear magneton.

Magnetostriction* - The change in dimensions of a solid sample when it is placed in a magnetic field.

Magnon - A quantum of magnetic energy associated with a spin wave in a ferromagnetic or antiferromagnetic crystal.

Mantle - The layer of the earth between the crust and the liquid outer core, which begins about 2900 km below the earth's surface.

Maser - A device in which a microwave cavity is filled with a medium where a population inversion can be produced by some means. When the resonant frequency of the cavity bears the proper relation to the separation of the inverted energy levels, the device can serve as an amplifier or oscillator at that frequency.

Mass (*m*)* - Quantity of matter. Mass can also be defined as "resistance to acceleration".

Mass defect (*B*) - Defined by $B = Zm(^1H) + Nm_n - m_a$, where Z is the atomic number, $m(^1H)$ is the mass of the hydrogen atom, N is the neutron number, m_n is the rest mass of the neutron, and m_a is the mass of the atom in question. Thus Bc^2 can be equated to the binding energy of the nucleus if the binding energy of atomic electrons is neglected. [1]

Mass excess (Δ) - Defined by $\Delta = m_a - Am_u$, where m_a is the mass of the atom, A the number of nucleons, and m_u the unified atomic mass constant ($m_u = 1$ u). [1]

Mass fraction (w_B) - The ratio of the mass of substance B to the total mass of a mixture. [1]

Mass number (*A*) - A characteristic property of a specific isotope of an element, equal to the sum of the number of protons and neutrons in the nucleus.

Mass spectrometry - An analytical technique in which ions are separated according to the mass/charge ratio and detected by a suitable detector. The ions may be produced by electron impact on a gas, a chemical reaction, energetic vaporization of a solid, etc. [6]

Massieu function - A thermodynamic function defined by $J = -A/T$, where A is the Helmholz energy and T the thermodynamic temperature. [2]

Matthiessen's rule - The statement that the electrical resistivity ρ of a metal can be written as $\rho = \rho_L + \rho_i$, where ρ_L is due to scattering of conduction electrons by lattice vibrations and ρ_i to scattering by impurities and imperfections. If the impurity concentration is small, ρ_i is temperature independent.

Maxwell (Mx)* - A non-SI unit of magnetic field strength (H) equal to 10^{-8} Wb. [1]

Maxwell's equations - The fundamental equations of electromagnetism. In a form appropriate to SI units, they are:

$$\text{curl } \boldsymbol{H} = \partial \boldsymbol{D}/\partial t + \boldsymbol{j}$$
$$\text{div } \boldsymbol{B} = 0$$
$$\text{curl } \boldsymbol{E} = -\partial \boldsymbol{B}/\partial t$$
$$\text{div } \boldsymbol{D} = \rho$$

where $\boldsymbol{H}$ is the magnetic field strength, $\boldsymbol{B}$ the magnetic induction, $\boldsymbol{E}$ the electric field strength, $\boldsymbol{D}$ the electric displacement, $\boldsymbol{j}$ the current density, ρ the charge density, and t is time.

Maxwell-Boltzmann distribution - An expression for the fraction of molecules $f(v)$ in a gas that have velocity v within a specified interval. It takes the form

$$f(v) = 4\pi(M/2\pi RT)^{3/2} v^2 e^{-Mv^2/2RT}$$

where M is the molar mass, R the molar gas constant, and T the temperature.

Mean free path* - The average distance a gas molecule travels between collisions.

Meissner effect - The complete exclusion of magnetic induction from the interior of a superconductor.

Melting point* - The temperature at which the solid and liquid phases of a substance are in equilibrium at a specified pressure (normally taken to be atmospheric unless stated otherwise).

Mercaptans - A traditional term abandoned by IUPAC, synonymous with thiols. This term is still widely used. [5]

Meson - Any elementary particle that has zero or integral spin. Mesons are responsible for the forces between protons and neutrons in the nucleus.

Mesosphere - The part of the earth's atmosphere extending from the top of the stratosphere (about 50 km above the surface) to 80-90 km. It is characterized by a decrease in temperature with increasing altitude.

Metal - A material in which the highest occupied energy band (conduction band) is only partially filled with electrons. The electrical conductivity of metals generally decreases with temperature.

Metallocenes - Organometallic coordination compounds in which one atom of a transition metal such as iron, ruthenium or osmium is bonded to and only to the face of two cyclopentadienyl ligands which lie in parallel planes. [5]

Meter (m)* - The SI base unit of length. [1]

Methine group - In organic compounds, the -C= group. [5]

Mho - An archaic name for the SI unit siemens (reciprocal ohm).

Micelle - A particle formed by the aggregation of surfactant molecules (typically, 10 to 100 molecules) in solution. For aqueous solutions, the hydrophilic end of the molecule is on the surface of the micelle, while the hydrophobic end (often a hydrocarbon chain) points toward the center. At the critical micelle concentration (cmc) the previously dissolved molecules aggregate into a micelle.

Micron (μ) - An obsolete name for micrometer.

Mie scattering - The scattering of light by spherical dielectric particles whose diameter is comparable to the wavelength of the light.

Milky way - The band of light in the night sky resulting from the stars in the galactic plane. The term is also used to denote the galaxy in which the sun is located.

Miller indices (*hkl*) - A set of indices used to label planes in a crystal lattice. [2]

Millimeter of mercury (mmHg) - A non-SI unit of pressure, equal to 133.322 Pa. The name is generally considered interchangeable with torr.

Mobility (μ)* - In solid state physics, the drift velocity of electrons or holes in a solid divided by the applied electric field strength. The term is used in a similar sense in other fields.

Molality (*m*) - A measure of concentration of a solution in which one states the amount of substance (i.e., number of moles) of solute per kilogram of solvent. Thus a 0.1 molal solution (often written as 0.1 m) has m = 0.1 mol/kg.

Molar mass - The mass of one mole of a substance. It is normally expressed in units of g/mol, in which case its numerical value is identical with the molecular weight (relative molecular mass). [1]

Molar quantity - It is often convenient to express an extensive quantity (e.g., volume, enthalpy, heat capacity, etc.) as the actual value divided by amount of substance (number of moles). The resulting quantity is called molar volume, molar enthalpy, etc

Molar refraction (*R*) - A property of a dielectric defined by the equation $R = V_m[(n^2-1)/(n^2+2)]$, where n is the index of refraction of the medium (at optical wavelengths) and V_m the molar volume. It is related to the polarizability α of the molecules that make up the medium by the Lorenz-Lorentz equation, $R = N_A\alpha/3\varepsilon_0$, where N_A is Avogadro's constant and ε_0 is the permittivity of a vacuum.

Molarity (*c*) - A measure of concentration of a solution in which one states the amount of substance (i.e., number of moles) of solute per liter of solution. Thus a 0.1 molar solution (often referred to as 0.1 M) has a concentration c = 0.1 mol/L.

Mole (mol)* - The SI base unit of amount of substance. [1]

Mole fraction (x_B) - The ratio of the amount of substance (number of moles) of substance B to the total amount of substance in a mixture. [1]

Molecular orbital - See Orbital.

Molecular weight (M_r)* - The ratio of the average mass per molecule or specified entity of a substance to 1/12 of the mass of nuclide ^{12}C. Also called relative molar (or molecular) mass. [1]

Moment of inertia (*I*) - The moment of inertia of a body about an axis is the sum (or integral) of the products of its elements of mass and the squares of their distances from the axis. [1]

Momentum (*p*) - The product of mass and velocity. [1]

Monomer - A substance consisting of molecules which can undergo polymerization, thereby contributing constitutional units to the essential structure of a macromolecule. [8]

Monosaccharides - A term which includes aldoses, ketoses, and a wide variety of derivatives. [5]

Mössbauer effect - The recoilless emission of γ-rays from nuclei bound in a crystal under conditions where the recoil energy associated with the γ emission is taken up by the crystal as a whole. This results in a very narrow line width, which can be exploited in various types of precise measurements.

Muon* - An unstable elementary particle of spin 1/2 and mass about 200 times that of the electron.

Naphtha - The petroleum fraction consisting mostly of C_6 to C_8 hydrocarbons and boiling in the range 80-120°C. Solvents derived from this fraction include ligroin and petroleum ether.

Nautical mile - A non-SI unit of length, equal to exactly 1852 m.

Navier-Stokes equations - A set of complex equations for the motion of a viscous fluid subject to external forces.

Néel temperature (T_N)* - The critical temperature above which an antiferromagnetic substance becomes paramagnetic. [1]

Nernst effect - The production of an electric field in a conductor subject to an applied magnetic field and containing a transverse temperature gradient. The electric field is perpendicular to the magnetic field and the temperature gradient.

Network - In polymer science, a highly ramified macromolecule in which essentially each constitutional unit is connected to each other constitutional unit and to the macroscopic phase boundary by many permanent paths through the macromolecule, the number of such paths increasing with the number of intervening bonds. The paths must on the average be coextensive with the macromolecule. [8]

Neutrino - A stable elementary particle in the lepton family. Neutrinos have zero (or at least near-zero) rest mass and spin 1/2.

Neutron* - An elementary particle on spin 1/2 and zero charge. The free neutron has a mean lifetime of 887 seconds. Neutrons and protons, which are collectively called nucleons, are the constituents of the nucleus.

Neutron activation analysis (NAA) - See Techniques for Materials Characterization, page 12-1.

Neutron number (*N*) - A characteristic property of a specific isotope of an element, equal to the number of neutrons in the nucleus.

Newton (N)* - The SI unit of force, equal to m kg s^{-2}. [1]

Nitriles - Compounds having the structure RC≡N; thus *C*-substituted derivatives of hydrocyanic acid, HC≡N. [5]

Nitrosamines - N-Nitroso amines: compounds of the structure R_2NNO. Compounds RNHNO are not ordinarily isolatable, but they, too, are nitrosamines. The name is a contraction of N-nitrosoamine and, as such, does not require the N locant. [5]

Nuclear magnetic resonance (NMR)* - A widely used technique in which the resonant absorption of radiofrequency radiation by magnetic nuclei in a magnetic field is measured. The results give important information on the local environment of each nucleus.

Nuclear magneton (μ_N)* - The unit of nuclear magnetic moment, defined as $eh/4\pi m_p$, where h is Planck's constant, m_p the proton mass, and e the elementary charge.

Nuclear quadrupole resonance (NQR) - See Techniques for Materials Characterization, page 12-1.

Nuclear reaction analysis (NRA) - See Techniques for Materials Characterization, page 12-1.

Nuclear spin (*I*) - The quantum number that specifies the intrinsic angular momentum of a particular nucleus. The magnitude of the angular momentum is given by $[I(I+1)]^{1/2}\, h/2\pi$, where h is Planck's constant.

Nucleic acids* - Macromolecules, the major organic matter of the nuclei of biological cells, made up of nucleotide units, and hydrolyzable into certain pyrimidine or purine bases (usually adenine, cytosine, guanine, thymine, uracil), D-ribose or 2-deoxy-D-ribose. [5]

Nucleon - A collective term for the proton and neutron.

Nucleosides - Ribosyl or deoxyribosyl derivatives (rarely, other glycosyl derivatives) of certain pyrimidine or purine bases. They are thus glycosylamines or N-glycosides related to nucleotides by the lack of phosphorylation. [5]

Nucleotides - Compounds formally obtained by esterification of the 3′ or 5′ hydroxy group of nucleosides with phosphoric acid. They are the monomers of nucleic acids and are formed from them by hydrolytic cleavage. [5]

Nuclide - A species of atoms in which each atom has identical atomic number Z and identical mass number A. [3]

Nusselt number (*Nu*) - A dimensionless quantity used in fluid mechanics, defined by $Nu = hl/k$, where h is coefficient of heat transfer, l is length, and k is thermal conductivity. [2]

Nyquist theorem - An expression for the mean square thermal noise voltage across a resistor, given by $4RkT\Delta f$ where R is the resistance, k the Boltzmann constant, T the temperature, and Δf the frequency band within which the voltage is measured.

Octanol-water partition coefficient (*P*)* - A measure of the way in which a compound will partition itself between the octanol and water phases in the two-phase octanol-water system, and thus an indicator of certain types of biological activity. Specifically, P is the ratio of the concentration (in moles per liter) of the compound in the octanol phase to that in the water phase at infinite dilution. The quantity normally reported is log P.

Oersted (Oe) - A non-SI unit of magnetic field (H), equal to 79.57747 A/m.

Ohm (Ω)* - The SI unit of electric resistance, equal to V/A. [1]

Ohm's law - A relation among electric current I, potential difference V, and resistance R, viz., $I = V/R$. The resistance is constant at constant temperature to high precision for many materials.

Olefins - Acyclic and cyclic hydrocarbons having one or more carbon-carbon double bonds, apart from the formal ones in aromatic compounds. The class olefins subsumes alkenes and cycloalkenes and the corresponding polyenes. [5]

Oligomer - A substance consisting of molecules of intermediate relative molecular mass (molecular weight), the structure of which essentially comprises the multiple repetition of units derived, actually or conceptually, from molecules of low relative molecular mass. In contrast to a polymer, the properties of an oligomer can vary significantly with the removal of one or a few of its units. [8]

Oligopeptides - Peptides containing from three to nine amino groups. [5]

Onsager relations - An important set of equations in the thermodynamics of irreversible processes. They express the symmetry between the transport coefficients describing reciprocal processes in systems with a linear dependence of flux on driving forces.

Optical rotary power - Angle by which the plane of polarization of a light beam is rotated by an optically active medium, divided by path length and by concentration of the active constituent. Depending on whether mass or molar concentration is used, the modifier "specific" or "molar" is attached. [2]

Orbital - A one-electron wavefunction. Atomic orbitals are classified as *s*-, *p*-, *d*,- or *f*-orbitals according to whether the angular momentum quantum number $l = 0$, 1, 2, or 3. Molecular orbitals, which are usually constructed as linear combinations of atomic orbitals, describe the distribution of electrons over the entire molecule.

Oscillator strength (*f*) - A measure of the intensity of a spectroscopic transition, defined by

$$f = \frac{8\pi^2 Mev}{3he^2}\left|\mu_{ij}\right|^2$$

where ν is the frequency, μ_{ij} the transition dipole moment, m_e the mass of the electron, e the elementary charge, and h Planck's constant.

Osmosis - The flow of a solvent in a system in which two solutions of different concentration are separated by a semipermeable membrane which cannot pass solute molecules. The solvent will flow from the side of lower concentration to that of higher concentration, thus tending to equalize the concentrations. The pressure that must be applied to the more concentrated side to stop the flow is called the osmotic pressure.

Osmotic coefficient (ϕ) - Defined by $\phi = \ln a_A/(M_A \Sigma m_B)$, where M_A is the molar mass of substance A (normally the solvent), a_A is its activity, and the m_B are molalities of the solutes. [1]

Osmotic pressure (Π) - The excess pressure necessary to maintain osmotic equilibrium between a solution and the pure solvent separated by a membrane permeable only to the solvent. In an ideal dilute solution $\Pi = c_B RT$, where c_B is the amount-of-substance concentration of the solute, R is the molar gas constant, and T the temperature. [1,2]

Ostwald dilution law - A relation for the concentration dependence of the molar conductivity Λ of an electrolyte solution, viz.,

$$\frac{1}{\Lambda} = \frac{1}{\Lambda^\circ} + \frac{\Lambda c}{K(\Lambda^\circ)^2}$$

where c is the solute concentration, K is the equilibrium constant for dissociation of the solute, and Λ° is the conductivity at $c\Lambda = 0$.

Ounce (oz) - A non-SI unit of mass. The avoirdupois ounce equals 28.34952 g, while the troy ounce equals 31.10348 g.

Overpotential (η) - In an electrochemical cell, the difference between the potential of an electrode and its zero-current value.

Oximes - Compounds of structure $R_2C{=}NOH$ derived from condensation of aldehydes or ketones with hydroxylamine. Oximes from aldehydes may be called aldoximes; those from ketones may be called ketoximes. [5]

Oxo compounds - Compounds containing an oxygen atom, =O, doubly bonded to carbon or another element. The term thus embraces aldehydes, carboxylic acids, ketones, sulfonic acids, amides and esters. [5]

Ozonides - The 1,2,4-trioxolanes formed by the reaction of ozone at a carbon-carbon double bond, or the analogous compounds derived from acetylenic compounds. [5]

Pair production - A process in which a photon is converted into a particle and its antiparticle (e.g., an electron and positron) in the electromagnetic field of a nucleus.

Paraffins - Obsolescent term for saturated hydrocarbons, commonly but not necessarily acyclic. Still widely used in the petrochemical industry, where the term designates acyclic saturated hydrocarbons, and stands in contradistinction to naphthenes. [5]

Paramagnetism* - A type of magnetism characterized by a positive magnetic susceptibility, so that the material becomes weakly magnetized in the direction of an external field. The magnetization disappears when the field in removed. In the simplest approximation (Curie's law) the susceptibility is inversely proportional to temperature.

Parity - The property of a quantum-mechanical wave function that describes its behavior under the symmetry operation of coordinate inversion. A parity of +1 (or even) is assigned if the wave function does not change sign when the signs of all the coordinates are changed; the parity is -1 (or odd) if the wave function changes sign under this operation.

Parsec (pc) - A unit of distance defined as the distance at which 1 astronomical unit (AU) subtends an angle of 1 second of arc. It is equal to 206264.806 AU or 3.085678×10^{16} m.

Particle induced x-ray emission (PIXE) - See Techniques for Materials Characterization, page 12-1.

Partition function (*q*, *z*) - For a single molecule, $q = \Sigma_i g_i \exp(\varepsilon_i/kT)$, where ε_i is an energy level of degeneracy g_i, k the Boltzmann constant, and T the absolute temperature; the summation extends over all energy states. For a system of N non-interacting molecules which are indistinguishable, as in an ideal gas, the canonical partition function $Q = qN/N!$.

Pascal (Pa)* - The SI unit of pressure, equal to N/m^2. [1]

Paschen series - The series of lines in the spectrum of the hydrogen atom which corresponds to transitions between the state with principal quantum number $n = 3$ and successive higher states. The wavelengths are given by $1/\lambda = R_H(1/9\text{-}1/n^2)$, where $n = 4,5,6,\ldots$ and R_H is the Rydberg constant. The first member of the series ($n = 3 \leftrightarrow 4$), which is often called the P_α line, falls in the infrared at a wavelength of 1.875 μm.

Paschen-Back effect - In atomic spectroscopy, the decoupling of electron spin from orbital angular momentum as the strength of an external magnetic field is increased.

Pauli exclusion principle - The statement that two electrons in an atom cannot have identical quantum numbers; thus if there are two electrons in the same orbital, their spin quantum numbers must be of opposite sign.

Pearson symbol - A code for designating crystallographic information, including the crystal system, the lattice type, and the number of atoms per unit cell.

Péclet number (*Pe*) - A dimensionless quantity used in fluid mechanics, defined by $Pe = vl/a$, where v is velocity, l is length, and a is thermal diffussivity. [2]

Peltier effect - The absorption or generation of heat (depending on the current direction) which occurs when an electric current is passed through a junction between two materials.

Peptides - Amides derived from two or more amino carboxylic acid molecules (the same or different) by formation of a covalent bond from the carbonyl carbon of one to the nitrogen atom of another with formal loss of water. [5]

Permeability (μ) - Magnetic induction divided by magnetic field strength; i.e. $\mu = B/H$. The relative permeability $\mu_r = \mu/\mu_0$, where μ_0 is the permeability of a vacuum. [1]

Permittivity (ε) - Ratio of the electric displacement in a medium to the electric field strength. Also called dielectric constant. [1]

Peroxides - Compounds of structure ROOR in which R may be any organic group. In inorganic chemistry, salts of the anion O_2^{-2} [5]

Peroxy acids - Acids in which an acidic -OH group has been replaced by an -OOH group; e.g. $CH_3C(=O)OOH$ peroxyacetic acid, $PhS(=O)_2OOH$ benzeneperoxysulfonic acid. [5]

Petroleum ether - The petroleum fraction consisting of C_5 and C_6 hydrocarbons and boiling in the range 35-60°C; commonly used as a laboratory solvent.

pH* - A convenient measure of the acid-base character of a solution, usually defined by $pH = -\log [c(H^+)/\text{mol } L^{-1})]$, where $c(H^+)$ is the concentration of hydrogen ions.The more precise definition is in terms af activity rather than concentration. [2]

Phenols - Compounds having one or more hydroxy groups attached to a benzene or other arene ring. [5]

Phonon - A quantum of energy associated with a vibrational mode of a crystal lattice.

Phosphines - PH_3 and compounds derived from it by substituting one, two or three hydrogen atoms by hydrocarbyl groups.

RPH_2, R_2PH and R_3P (R not equal to H) are called primary, secondary and tertiary phosphines, respectively. [5]

Phosphonium compounds - Salts (and hydroxides) $[R_4P]^+X^-$ containing tetracoordinate phosphonium ion and the associated anion. [5]

Phosphonium ylides - Compounds having the structure R_3P^+-$C^-R_2 \rightleftharpoons R_3P{=}CR_2$. Also known as Wittig reagents. [5]

Phosphoresence - The process by which a molecule is excited by light to a higher electronic state and then undergoes a radiationless transition to a state of different multiplicity from which it decays, after some delay, to the ground state. The emitted light is normally of longer wavelength than the exciting light because vibrational energy has been dissipated.

Photoelectric effect - The complete absorption of a photon by a solid with the emission of an electron.

Photon - An elementary particle of zero mass and spin 1/2. The photon is involved in electromagnetic interactions and is the quantum of electromagnetic radiation.

Photon stimulated desorption (PSD) - See Techniques for Materials Characterization, page 12-1.

Pinacols - Tetra(hydrocarbyl)ethane-1,2-diols, $R_2C(OH)C(OH)R_2$, of which the tetramethyl example is the simplest one and is itself commonly known as pinacol. [5]

Pion - An elementary particle in the family of mesons. Pions have zero spin and may be neutral or charged. They participate in the strong interaction which holds the nucleus together.

p*K** - The negative logarithm (base 10) of an equilibrium constant *K*. For pK_a, see Acid dissociation constant.

Planck constant (*h*)* - The elementary quantum of action, which relates energy to frequency through the equation $E = h\nu$.

Planck distribution - See Black body radiation

Planck function - A thermodynamic function defined by $Y = -G/T$, where G is Gibbs energy and T thermodynamic temperature. [2]

Plasma - A highly ionized gas in which the charge of the electrons is balanced by the charge of the positive ions, so that the system as a whole is electrically neutral.

Plasmon - A quantum associated with a plasma oscillation in the electron gas of a solid.

Point group* - A group of symmetry operations (rotations, reflections, etc.) that leave a molecule invariant. Every molecular conformation can be assigned to a specific point group, which plays a major role in determining the spectrum of the molecule.

Poise (P) - A non-SI unit of viscosity, equal to 0.1 Pa s.

Poiseuille's equation - A formula for the rate of flow of a viscous fluid through a tube:

$$\frac{dV}{dt} = \frac{(p_1^2 - p_2^2)\pi r^4}{16 l \eta p_0}$$

where V is the volume as measured at pressure p_0; p_1 and p_2 are the pressures at each end of the tube; r is the radius and l the length of the tube; and η is the viscosity.

Poisson ratio (μ) - The absolute value of the ratio of the transverse strain to the corresponding axial strain resulting from uniformly distributed axial stress below the proportional limit (i.e., where Hooke's law is valid). [10]

Polariton - A quantum associated with the coupled modes of photons and optical phonons in an ionic crystal.

Polarizability (α)* - The change in dipole moment of a molecule produced by an external electric field; specifically, $\alpha_{ab} = \partial p_a / \partial E_b$, where p_a is the dipole moment component on the a axis and E_b is the component of the electric field strength along the b axis. [2]

Polymer - A substance composed of molecules of high relative molecular mass (molecular weight), the structure of which essentially comprises the multiple repetition of units derived, actually or conceptually, from molecules of low relative molecular mass. A single molecule of a polymer is called a macromolecule. [8]

Polypeptides - Peptides containing 10 or more amino acid residues. See also Peptides. [5]

Polysaccharides - Compounds consisting of a large number of monosaccharides linked glycosidically. This term is commonly used only for those containing more than ten monosaccharide residues. Also called glycans. [5]

Porphyrins - Natural pigments containing a fundamental skeleton of four pyrrole nuclei united through the α-positions by four methine groups to form a macrocyclic structure (porphyrin is designated porphine in Chemical Abstracts indexes). [5]

Positron - The antiparticle of the electron. It has the same mass and spin as an electron, and an equal but opposite charge.

Positronium - The hydrogen-like "atom" formed from a positron nucleus and an electron. Its lifetime is very short because of annihilation of the positron and electron.

Potential - See Electric potential

Potential energy (E_p, *V, U*) - The portion of the energy of a system that is associated with its position in a force field.

Pound (lb) - A non-SI unit of mass, equal to 0.4535924 kg.

Power (*P*) - Rate of energy transfer. For electrical circuits, this is equal to the product of current and potential difference, $P = IV$. [1]

Poynting vector (*S*) - For electromagnetic radiation, the vector product of the electric field strength and the magnetic field strength. [1]

Prandtl number (*Pr*) - A dimensionless quantity used in fluid mechanics, defined by $Pr = \eta/\rho a$, where η is viscosity, ρ is density, and a is thermal diffusivity. [2]

Pressure* - Force divided by area. [1]

Proteins - Naturally occurring and synthetic polypeptides having molecular weights greater than about 10,000 (the limit is not precise). See also Peptides. [5]

Proton* - A stable elementary particle of unit positive charge and spin 1/2. Protons and neutrons, which are collectively called nucleons, are the constituents of the nucleus.

Pulsar - A neutron star which rotates rapidly and emits electromagnetic radiation in regular pulses at a frequency related to the rotation period.

Purine bases* - Purine and its substitution derivatives, especially naturally occurring examples. [5]

Pyrimidine bases* - Pyrimidine and its substitution derivatives, especially naturally occurring examples. [5]

Q-switching - A technique for obtaining very high power from a laser by keeping the Q factor of the laser cavity low while the population inversion builds up, then suddenly increasing the Q to initiate the stimulated emission.

Quad - A unit of energy defined as 10^{15} Btu, equal to approximately 1.055056×10^{18} J.

Quadrupole moment - A coefficient of the third term (after monopole and dipole) in the power series expansion of the electric potential of an array of charges. A nucleus of spin greater than 1/2 has a non-vanishing nuclear quadrupole moment which can interact with the electric field gradient of the surrounding electrons. Molecular quadrupole moments have an influence on intermolecular forces.

Quality factor (*Q*) - The ratio of the absolute value of the reactance of an electrical system to the resistance; thus a measure of the energy stored per cycle relative to the energy dissipated.

Quantum yield - In photochemistry, the number of moles transformed in a specific process, either physically (e.g., by emission of photons) or chemically, per mole of photons absorbed by the system. [3]

Quark - An elementary entity which has not been directly observed but is considered a constituent of protons, neutrons, and other hadrons.

Quasar - An extragalactic object emitting electromagnetic radiation at a very high power level and showing a very large red shift, thus indicating that the object is receding at a speed approaching the speed of light.

Quasicrystal - A solid having conventional crystalline properties but whose lattice does not display translational periodicity.

Quaternary ammonium compounds - Derivatives of ammonium compounds, $NH_4^+ Y^-$, in which all four of the hydrogens bonded to nitrogen have been replaced with hydrocarbyl groups. Compounds having a carbon-nitrogen double bond (i.e. $R_2C{=}N^+R_2Y^-$) are more accurately called iminium compounds. [5]

Quinones - Compounds having a fully conjugated cyclic dione structure, such as that of benzoquinones, derived from aromatic compounds by conversion of an even number of -CH= groups into -C(=O)- groups with any necessary rearrangement of double bonds. [5]

Racemic mixture - A mixture of equal amounts of a pair of enantiomers (optical isomers); such a mixture is not optically active.

Rad - A non-SI unit of absorbed dose of radiation, equal to 0.01 Gy.

Radiance (*L*) - The radiant intensity in a given direction from an element of a surface, divided by the area of the orthogonal projection of this element on a plane perpendicular to the given direction. [1]

Radiant intensity (*I*) - The radiant energy flux leaving an element of a source within an element of solid angle, divided by that element of solid angle. [1]

Radicals - Molecular entities possessing an unpaired electron, such as $\cdot CH_3$, $\cdot SnH_3$, $\cdot Cl$. (In these formulas the dot, symbolizing the unpaired electron, should be placed so as to indicate the atom of highest spin density, if this is possible). [5]

Raman effect - The inelastic scattering of light by a molecule, in which the incident photon either gives up to, or receives energy from, one of the internal vibrational modes of the molecule. The scattered light thus has either a lower frequency (Stokes radiation) or higher frequency (anti-Stokes radiation) than the incident light. These shifts provide a measure of the normal vibrational frequencies of the molecule.

Rankine cycle - A thermodynamic cycle which can be used to calculate the ideal performance of a heat engine that uses a condensable vapor as the working fluid (e.g., a steam engine or a heat pump).

Rankine temperature - A thermodynamic temperature scale based on a temperature interval °R = (5/9) K ; i.e., $T/°R = (9/5)T/K = t/°F + 459.67$.

Raoult's law - The expression for the vapor pressure p_i of component i in an ideal solution, viz., $p_i = x_i p_{i0}$, where x_i is the mole fraction of component i and p_{i0} the vapor pressure of the pure substance i.

Rare earth elements - The elements Sc, Y, and the lanthanides (La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu). [7]

Rayleigh number (*Ra*) - A dimensionless quantity used in fluid mechanics, defined by $Ra = l^3 g\alpha\Delta T\rho/\eta a$, where l is length, g is acceleration of gravity, α is cubic expansion coefficient, T is temperature, ρ is density, η is viscosity, and a is thermal diffusivity. [2]

Rayleigh scattering - The scattering of light by particles which are much smaller than the wavelength of the light. It is characterized by a scattered intensity which varies as the inverse fourth power of the wavelength.

Rayleigh wave - A guided elastic wave along the surface of a solid; also called surface acoustic wave.

Reactance (*X*) - The imaginary part of impedance. For an inductive reactance L and a capacitive reactance C in series, the reactance is $X = L\omega - 1/(C\omega)$, where ω is 2π times the frequency of the current. [1]

Red shift - A displacement of a spectral line toward longer wavelengths. This can occur through the Doppler effect (e.g., in the light from receding galaxies) or, in the general theory of relativity, from the effects of a star's gravitational field.

Reflectance (ρ) - Ratio of the radiant or luminous flux at a given wavelength that is reflected to that of the incident radiation. Also called reflection factor. [1]

Reflection high energy electron diffraction (RHEED) - See Techniques for Materials Characterization, page 12-1.

Relative humidity* - The ratio of the partial pressure of water vapor in air to the saturation vapor pressure of water at the same temperature, expressed as a percentage. [10]

Relative molar mass - See Molecular weight.

Rem - A non-SI unit of dose equivalent, equal to 0.01 Sv.

Resistance (*R*) - Electric potential difference divided by current when there is no electromotive force in the conductor. This definition applies to direct current. More generally, resistance is defined as the real part of impedance. [1]

Resistivity (ρ) - Electric field strength divided by current density when there is no electromotive force in the conductor. Resistivity is an intrinsic property of a material. For a conductor of uniform cross section with area A and length L, and whose resistance is R, the resistivity is given by $\rho = RA/L$. [1]

Reynolds number (*Re*) - A dimensionless quantity used in fluid mechanics, defined by $Re = \rho v l/\eta$, where ρ is density, v is velocity, l is length, and η is viscosity. [2]

Rheology - The study of the flow of liquids and deformation of solids. Rheology addresses such phenomena as creep, stress relaxation, anelasticity, nonlinear stress deformation, and viscosity.

Ribonucleic acids (RNA) - Naturally occurring polyribonucleotides. See also nucleic acids, nucleosides, nucleotides, ribonucleotides. [5]

Ribonucleotides - Nucleotides in which the glycosyl group is a ribosyl group. See also nucleotides. [5]

Roentgen (R) - A unit used for expressing the charge (positive or negative) liberated by x-ray or γ radiation in air, divided by the mass of air. A roentgen is defined as 2.58×10^{-4} C/kg.

Rotational constants - In molecular spectroscopy, the constants appearing in the expression for the rotational energy levels as a function of the angular momentum quantum numbers. These constants are proportional to the reciprocals of the principal moments of inertia, averaged over the vibrational motion.

Rutherford back scattering (RBS) - See Techniques for Materials Characterization, page 12-1.

Rydberg constant (R_∞)* - The fundamental constant which appears in the equation for the energy levels of hydrogen-like atoms; i.e., $E_n = hcR_\infty Z^2\mu/n^2$, where h is Planck's constant, c the speed of light, Z the atomic number, μ the reduced mass of nucleus and electron, and n the principal quantum number (n = 1, 2, ...).

Rydberg series - A regular series of lines in the spectrum of an atom or molecule, with the spacing between successive lines becoming smaller as the frequency increases (wavelength decreases). The series eventually converges to a limit which usually corresponds to the complete removal of an electron from the atom or molecule.

Sackur-Tetrode equation* - An equation for the molar entropy S_m of an ideal monatomic gas: $S_m = R\ln(e^{5/2}\, V/N_A\Lambda^3)$, where R is the molar gas constant, V is the volume, and N_A is Avogadro's number. The constant Λ is given by $\Lambda = h/(2\pi mkT)^{1/2}$, where h is Planck's constant, m the atomic mass, k the Boltzmann constant, and T the temperature.

Salinity (S)* - A parameter used in oceanography to describe the concentration of dissolved salts in seawater. It is defined in terms of electrical conductivity relative to a standard solution of KCl. When expressed in units of parts per thousand, S may be roughly equated to the concentration of dissolved material in grams per kilogram of seawater.

Salt - An ionic compound formed by the reaction of an acid and a base.

Scanned probe microscopy (SPM) - See Techniques for Materials Characterization, page 12-1.

Scanning electron microscopy (SEM) - See Techniques for Materials Characterization, page 12-1.

Scanning laser acoustic microscopy (SLAM) - See Techniques for Materials Characterization, page 12-1.

Scanning transmission electron microscopy (STEM) - See Techniques for Materials Characterization, page 12-1.

Scanning tunneling microscopy (STM) - See Techniques for Materials Characterization, page 12-1.

Schiff bases - Imines bearing a hydrocarbyl group on the nitrogen atom: $R_2C{=}NR'$ (R′ not equal to H). Considered by many to be synonymous with azomethines. [5]

Schmidt number (Sc) - A dimensionless quantity used in fluid mechanics, defined by $Sc = \eta/\rho D$, where η is viscosity, ρ is density, and D is diffusion coefficient. [2]

Schottky barrier - A potential barrier associated with a metal-semiconductor contact. It forms the basis for the rectifying device known as the Schottly diode.

Schrödinger equation - The basic equation of wave mechanics which, for systems not dependent on time, takes the form:

$$-(\hbar/2m)\nabla^2\psi + V\psi = E\psi$$

where ψ is the wavefunction, V is the potential energy expressed as a function of the spatial coordinates, E is an energy eigenvalue, ∇^2 is the Laplacian operator, $\hbar$ is Planck's constant divided by 2π, and m is the mass.

Second (s)* - The SI base unit of time. [1]

Second radiation constant (c_2)* - See First radiation constant.

Secondary ion mass spectroscopy (SIMS) - See Techniques for Materials Characterization, page 12-1.

Seebeck effect - The development of a potential difference in a circuit where two different metals or semiconductors are joined and their junctions maintained at different temperatures. It is the basis of the thermocouple.

Selenides - Compounds having the structure RSeR (R not equal to H). They are thus selenium analogues of ethers. Also used for metal salts of H_2Se. [5]

Semicarbazones - Compounds having the structure $R_2C{=}NNHC(=O)NH_2$, formally derived by condensation of aldehydes or ketones with semicarbazide [$NH_2NHC(=O)NH_2$]. [5]

Semiconductor - A material in which the highest occupied energy band (valence band) is completely filled with electrons at T = 0 K, and the energy gap to the next highest band (conduction band) ranges from 0 to 4 or 5 eV. With increasing temperature electrons are excited into the conduction band, leading to an increase in the electrical conductivity.

Semiquinones - Radical anions having the structure -O-Z-O· where Z is an ortho- or para-arylene group or analogous heteroarylene group; they are formally generated by the addition of an electron to a quinone. [5]

SI units* - The International System of Units adopted in 1960 and recommended for use in all scientific and technical fields. [1]

Siemens (S)* - The SI unit of electric conductance, equal to Ω^{-1}. [1]

Sievert (Sv)* - The SI unit of dose equivalent (of radiation), equal to J/kg. [1]

Silanes - Saturated silicon hydrides, analogues of the alkanes; i.e. compounds of the general formula Si_nH_{2n+2}. Silanes may be subdivided into silane, oligosilanes, and polysilanes. Hydrocarbyl derivatives are often referred to loosely as silanes. [5]

Silicones - Polymeric or oligomeric siloxanes, usually considered unbranched, of general formula $[\text{-}OSiR_2\text{-}]_n$ (R not equal to H). [5]

Siloxanes - Saturated silicon-oxygen hydrides with unbranched or branched chains of alternating silicon and oxygen atoms (each silicon atom is separated from its nearest silicon neighbors by single oxygen atoms). [5]

Skin effect - The concentration of high frequency alternating currents near the surface of a conductor.

Slater orbital - A particular mathematical expression for the radial part of the wave function of a single electron, which is used in quantum-mechanical calculations of the energy and other properties of atoms and molecules.

Small angle neutron scattering (SANS) - See Techniques for Materials Characterization, page 12-1.

Snell's law - The relation between the angle of incidence i and the angle of refraction r of a light beam which passes from a medium of refractive index n_0 to a medium of index n_1, viz., $\sin i/\sin r = n_1/n_0$.

Solar constant* - The mean radiant energy flux from the sun on a unit surface normal to the direction of the rays at the mean

distance of the earth from the sun. The value is approximately 1373 W/m^2.

Solar wind - The stream of high velocity hydrogen and helium ions emitted by the sun which flows through the solar system and beyond.

Soliton - A spatially localized wave in a solid or liquid that can interact strongly with other solitons but will afterwards regain its original form.

Solubility* - A quantity expressing the maximum concentration of some material (the solute) that can exist in another liquid or solid material (the solvent) at thermodynamic equilibrium at specified temperature and pressure. Common measures of solubility include the mass of solute per unit mass of solution (mass fraction), mole fraction of solute, molality, molarity, and others.

Solubility product constant (K_{sp})* - The equilibrium constant for the dissolution of a sparsely soluble salt into its constituent ions.

Space group* - A group of symmetry operations (reflections, rotations, etc.) that leave a crystal invariant. A total of 230 space groups have been identified.

Spark source mass spectroscopy (SSMS) - See Techniques for Materials Characterization, page 12-1.

Specific gravity - Ratio of the mass density of a material to that of water. Since one must specify the temperature of both the sample and the water to have a precisely defined quantity, the use of this term is now discouraged.

Specific heat - Heat capacity divided by mass. See Heat capacity.

Specific quantity - It is often convenient to express an extensive quantity (e.g., volume, enthalpy, heat capacity, etc.) as the actual value divided by mass. The resulting quantity is called specific volume, specific enthalpy, etc.

Specific rotation $[\alpha]^{\theta}_{\lambda}$ - For an optically active substance, defined by $[\alpha]^{\theta}_{\lambda} = \alpha/\gamma l$, where α is the angle through which plane polarized light is rotated by a solution of mass concentration γ and path length l. Here θ is the Celsius temperature and λ the wavelength of the light at which the measurement is carried out. Also called specific optical rotatory power. [2]

Spin (*s, I*)* - A measure of the intrinsic angular momentum of a particle, which it possesses independent of its orbital motion. The symbol s is used for the spin quantum number of an electron, while I is generally used for nuclear spin.

Spiro compounds - Compounds having one atom (usually a quaternary carbon) as the only common member of two rings. [5]

Stacking fault - An error in the normal sequence of layer growth in a crystal.

Standard mean ocean water (SMOW) - A standard sample of pure water of accurately known isotopic composition which is maintained by the International Atomic Energy Agency. It is used for precise calibration of density and isotopic composition measurements.

Standard reduction potential (E°) - The zero-current potential of a cell in which the specified reduction reaction occurs at the right-hand electrode and the left-hand electrode is the standard hydrogen electrode. Also called Standard electrode potential.

Standard state - A defined state (specified temperature, pressure, concentration, etc.) for tabulating thermodynamic functions and carrying out thermodynamic calculations. The standard state pressure is usually taken as 100,000 Pa (1 bar), but various standard state temperatures are used. [2]

Stanton number (*St*) - A dimensionless quantity used in fluid mechanics, defined by $St = h/\rho v c_p$, where h is coefficient of heat transfer, ρ is density, v is velocity, and c_p is specific heat capacity at constant pressure. [2]

Stark effect - The splitting of an energy level of an atom or molecule, and hence a splitting of spectral lines arising from that level, as a result of the application of an external electric field.

Statistical weight (*g*) - The number of distinct states corresponding to the same energy level. Also called degeneracy.

Stefan-Boltzmann constant (σ)* - Constant in the equation for the radiant exitance M (radiant energy flux per unit area) from a black body at thermodynamic temperature T, viz. $M = \sigma T^4$. [1]

Stibines - SbH_3 and compounds derived from it by substituting one, two or three hydrogen atoms by hydrocarbyl groups: R_3Sb. $RSbH_2$, R_2SbH, and R_3Sb (R not equal to H) are called primary, secondary and tertiary stibines, respectively. [5]

Stochastic process - A process which involves random variables and whose outcome can thus be described only in terms of probabilities.

Stoichiometric number (ν) - The number appearing before the symbol for each compound in the equation for a chemical reaction. By convention, it is negative for reactants and positive for products. [2]

Stokes (St) - A non-SI unit of kinematic viscosity, equal to 10^{-4} m^2/s.

Stokes' law - The statement, valid under certain conditions, that the viscous force F experienced by a sphere of radius a moving at velocity v in a medium of viscosity η is given by $F = -6\pi\eta a v$.

Strain - The deformation of a body that results from an applied stress.

Stratosphere - The part of the earth's atmosphere extending from the top of the troposphere (typically 10 to 15 km above the surface) to about 50 km. It is characterized by an increase in temperature with increasing altitude.

Stress - Force per unit area (pressure) applied to a body. Tensile stress tends to stretch or compress the body in the direction of the applied force. Sheer stress results from a tangential force which tends to twist the body.

Strong interaction - The short range (order of 1 fm) attractive forces between protons, neutrons, and other hadrons which are responsible for the stability of the nucleus.

Strouhal number (*Sr*) - A dimensionless quantity used in fluid mechanics, defined by $Sr = lf/v$, where l is length, f is frequency, and v is velocity. [2]

Structure factor - In x-ray crystallography, the sum of the scattering factors of all the atoms in a unit cell, weighted by an appropriate phase factor. The intensity of a given reflection is proportional to the square of the structure factor.

Sublimation pressure - The pressure of a gas in equilibrium with a solid at a specified temperature.

Sulfides - Compounds having the structure RSR (R not equal to H). Such compounds were once called thioethers. In an inorganic sense, salts or other derivatives of hydrogen sulfide. [5]

Sulfones - Compounds having the structure, $RS(=O)_2R$ (R not equal to H), e.g. $C_2H_5S(=O)_2CH_3$, ethyl methyl sulfone. [5]

Sulfonic acids - $HS(=O)_2OH$, sulfonic acid, and its S-hydrocarbyl derivatives. [5]

Sulfoxides - Compounds having the structure $R_2S=O$ (R not equal to H), e.g. $Ph_2S=O$, diphenyl sulfoxide. [5]

Superconductor - A material that experiences a nearly total loss of electrical resistivity below a critical temperature T_c. The effect can occur in pure metals, alloys, semiconductors, organic compounds, and certain inorganic solids.

Superfluid - A fluid with near-zero viscosity and extremely high thermal conductivity. Liquid helium exhibits these properties below 2.186 K (the λ point).

Supernova - A star in the process of exploding because of instabilities which follow the exhaustion of its nuclear fuel.

Surface analysis by laser ionization (SALI) - See Techniques for Materials Characterization, page 12-1.

Surface tension (γ,σ)* - The force per unit length in the plane of the interface between a liquid and a gas, which resists an increase in the area of that surface. It can also be equated to the surface Gibbs energy per unit area.

Surfactant - A substance which lowers the surface tension of the medium in which it is dissolved, and/or the interfacial tension with other phases, and accordingly is positively adsorbed at the liquid-vapor or other interfaces. [3]

Susceptance (*B*) - Imaginary part of admittance. [1]

Svedberg - A non-SI unit of time, used to express sedimentation coefficients, equal to 10^{-13} s.

Syndiotactic macromolecule - A tactic macromolecule, essentially comprising alternating enantiomeric configurational base units which have chiral or prochiral atoms in the main chain in a unique arrangement with respect to their adjacent constitutional units. In this case the repeating unit consists of two configurational base units that are enantiomeric. [8]

Tacticity - The orderliness of the succession of configurational repeating units of a macromolecule or oligomer molecule. In a tactic macromolecule essentially all the configurational repeating units are identical with respect to directional sense. See Configurational repeating unit, Isotactic, Syndiotactic. [8]

Tautomerism - Isomerism of the general form G-X-Y=Z ⇌ X=Y-Z-G, where the isomers (called tautomers) are readily interconvertible; the atoms connecting the groups X, Y, Z are typically any of C, H, O, or S, and G is a group which becomes an electrofuge (i.e., a group that does not carry away the bonding electron pair when it leaves its position in the molecule) or nucleofuge (a group that does carry away the bonding electrons when leaving) during isomerization. The commonest case, when the electrofuge is H^+, is also known as prototropy. A common example, written so as to illustrate the general pattern given above, is keto-enol tautomerism, such as

$$H\text{-}O\text{-}C(CH_3)=CH\text{-}CO_2Et \text{ (enol)} \rightleftharpoons (CH_3)C(=O)\text{-}CH_2\text{-}CO_2Et \text{ (keto)}$$

In some cases the interconversion rate between tautomers is slow enough to permit isolation of the separate keto and enol forms. [5]

Tensile strength* - In tensile testing, the ratio of maximum load a body can bear before breaking to original cross-sectional area. Also called ultimate strength. [11]

Terpenes - Hydrocarbons of biological origin having carbon skeletons formally derived from isoprene [$CH_2=C(CH_3)CH=CH_2$]. [5]

Terpenoids - Natural products and related compounds formally derived from isoprene units. They contain oxygen in various functional groups. The skeleton of terpenoids may differ from strict additivity of isoprene units by the loss or shift of a methyl (or other) group. [5]

Tesla (T)* - The SI unit of magnetic flux density (B), equal to V s/m^2. [1]

Thermal conductivity* - Rate of heat flow divided by area and by temperature gradient. [1]

Thermal diffusivity - Thermal conductivity divided by density and by specific heat capacity at constant pressure. [1]

Thermal expansion coefficient (α)* - The linear expansion coefficient is defined by $\alpha_l = (1/l)(dl/dT)$; the volume expansion coefficient by $\alpha_V = (1/V)(dV/dT)$. [1]

Thermionic emission - The emission of electrons from a solid as a result of heat. The effect requires a high enough temperature to impart sufficient kinetic energy to the electrons to exceed the work function of the solid.

Thermodynamic laws - The foundation of the science of thermodynamics:

First law: The internal energy of an isolated system is constant; if energy is supplied to the system in the form of heat dq and work dw, then the change in energy $dU = dq + dw$.

Second law: No process is possible in which the only result is the transfer of heat from a reservoir and its complete conversion to work.

Third law: The entropy of a perfect crystal approaches zero as the thermodynamic temperature approaches zero.

Thermoelectric power - For a bar of a pure material whose ends are at different temperatures, the potential difference divided by the difference in temperature of the ends. See also Seeback effect.

Thermogravimetric analysis (TGA) - See Techniques for Materials Characterization, page 12-1.

Thermosphere - The layer of the earth's atmosphere extending from the top of the mesosphere (typically 80–90 km above the surface) to about 500 km. It is characterized by a rapid increase in temperature with increasing altitude up to about 200 km, followed by a leveling off in the 300–500 km region.

Thiols - Compounds having the structure RSH (R not equal to H). Also known by the term mercaptans (abandoned by IUPAC); e.g. CH_3CH_2SH, ethanethiol. [5]

Thomson coefficient (μ, τ) - The heat power developed in the Thomson effect (whereby heat is evolved in a conductor when a current is flowing in the presence of a temperature gradient), divided by the current and the temperature difference. [1]

Tonne (t) - An alternative name for megagram (1000 kg). [1]

Torque (*T*) - For a force $\boldsymbol{F}$ that produces a torsional motion, $\boldsymbol{T} = \boldsymbol{r} \times \boldsymbol{F}$, where $\boldsymbol{r}$ is a vector from some reference point to the point of application of the force.

Torr - A non-SI unit of pressure, equal to 133.322 Pa. The name is generally considered interchangeable with millimeter of mercury.

Townsend coefficient - In a radiation counter, the number of ionizing collisions by an electron per unit path length in the direction of an applied electric field.

Transducer - Any device that converts a signal from acoustical, optical, or some other form of energy into an electrical signal (or vice versa) while preserving the information content of the original signal.

Transistor - A voltage amplifier using controlled electron currents inside a semiconductor.

Transition metals - Elements characterized by a partially filled *d* subshell. The First Transition Series comprises Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu. The Second and Third Transition Series include the lanthanides and actinides, respectively. [7]

Transition probability* - See Einstein transition probability.

Transmittance (τ) - Ratio of the radiant or luminous flux at a given wavelength that is transmitted to that of the incident radiation. Also called transmission factor. [1]

Tribology - The study of frictional forces between solid surfaces.

Triple point* - The point in p,T space where the solid, liquid, and gas phases of a substance are in thermodynamic equilibrium. The corresponding temperature and pressure are called the triple point temperature and triple point pressure.

Troposphere - The lowest part of the earth's atmosphere, extending to 10-15 km above the surface. It is characterized by a decrease in temperature with increasing altitude. The exact height varies with latitude and season.

Tunnel diode - A device involving a p-n junction in which both sides are so heavily doped that the Fermi level on the p-side lies in the valence band and on the n-side in the conduction band. This leads to a current-voltage curve with a maximum, so that the device exhibits a negative resistance in some regions.

Ultraviolet photoelectron spectroscopy (UPS) - See Techniques for Materials Characterization, page 12-1.

Umklapp process - A process involving the interaction of three or more waves (lattice or electron) in a solid in which the sum of the wave vectors does not equal zero.

Unified atomic mass unit (u)* - A unit of mass used in atomic, molecular, and nuclear science, defined as the mass of one atom of ^{12}C divided by 12. Its approximate value is 1.66054×10^{-27} kg. [1]

Universal time (t_U, UT) - Mean solar time counted from midnight at the Greenwich meridian. Also called Greenwich mean time (GMT). The interval of mean solar time is based on the average, over one year, of the time between successive transits of the sun across the observer's meridian.

Vacancy - A missing atom or ion in a crystal lattice.

Van Allen belts - Two toroidal regions above the earth's atmosphere containing protons and electrons. The outer belt at about 25,000 km above the surface is probably of solar origin. The inner belt at about 3000 km contains more energetic particles from outside the solar system.

Van der Waals' equation* - An equation of state for fluids which takes the form:

$$pV_m = RT\left(\frac{1}{V_m - b} - \frac{a}{V_m^2}\right)$$

where p is pressure, V_m is molar volume, T is temperature, R is the molar gas constant, and a and b are characteristic parameters of the substance which describe the effect of attractive and repulsive intermolecular forces, respectively.

Van der Waals' force - The weak attractive force between two molecules which arises from electric dipole interactions. It can lead to the formation of stable but weakly bound dimer molecules or clusters.

Van't Hoff equation - The equation expressing the temperature dependence of the equilibrium constant K of a chemical reaction:

$$\frac{d\ln K}{dT} = \frac{\Delta_r H^\circ}{RT^2}$$

where $\Delta_r H^\circ$ is the standard enthalpy of reaction, R the molar gas constant, and T the temperature. Also called van't Hoff isochore.

Vapor pressure* - The pressure of a gas in equilibrium with a liquid (or, in some usage, a solid) at a specified temperature.

Varistor - A device that utilizes the properties of certain metal oxides with small amounts of impurities, which show abrupt nonlinearities at specific voltages where the material changes from a semiconductor to an insulator.

Velocity (v) - Rate of change of distance with time.

Verdet constants (V)* - Angle of rotation of a plane polarized light beam passing through a medium in a magnetic field, divided by the field strength and by the path length.

Virial equation of state* - An equation relating the pressure p, molar volume V_m, and temperature T of a real gas in the form of an expansion in powers of the molar volume, viz., $pV_m = RT(1+BV_m^{-1}+CV_m^{-2}+\ldots)$, where R is the molar gas constant. B is called the second virial coefficient, C the third virial coefficient, etc. The virial coefficients are functions of temperature.

Viscosity (η)* - The proportionality factor between sheer rate and sheer stress, defined through the equation $F = \eta A(dv/dx)$, where F is the tangential force required to move a planar surface of area A at velocity v relative to a parallel surface separated from the first by a distance x. Sometimes called dynamic or absolute viscosity. The term kinematic viscosity (symbol ν) is defined as η divided by the mass density.

Volt (V)* - The SI unit of electric potential, equal to W/A. [1]

Volume fraction (ϕ_j) - Defined as $V_j/\Sigma_i V_i$, where V_j is the volume of the specified component and the V_i are the volumes of all the components of a mixture prior to mixing. [2]

Watt (W)* - The SI unit of power, equal to J/s. [1]

Wave function - A function of the coordinates of all the particles in a quantum mechanical system (and, in general, of time) which fully describes the state of the system. The product of the wave function and its complex conjugate is proportional to the probability of finding a particle at a particular point in space.

Weak interaction - The weak forces (order of 10^{-12} of the strong interaction) between elementary particles which are responsible for beta decay and other nuclear effects.

Weber (Wb)* - The SI unit of magnetic flux, equal to V s. [1]

Weber number (We) - A dimensionless quantity used in fluid mechanics, defined by $We = \rho v^2 l/\gamma$, where ρ is density, v is velocity, l is length, and γ is surface tension. [2]

Weight - That force which, when applied to a body, would give it an acceleration equal to the local acceleration of gravity. [1]

Wiedeman-Franz law - The law stating that the thermal conductivity k and electrical conductivity σ of a pure metal are related by $k = L\sigma T$, where T is the temperature and L (called the Lorenz ratio) has the approximate value 2.45×10^{-8} V²/K².

Wien displacement law - The relation, which can be derived from the Planck formula for black body radiation, that

$\lambda_{max}T = 0.0028978$ m K, where λ_{max} is the wavelength of maximum radiance at temperature T.

Wigner-Seitz method - A method of calculating electron energy levels in a solid using a model in which each electron is subject to a spherically symmetric potential.

Wittig reagents - See phosphonium ylides.

Work (*W*) - Force multiplied by the displacement in the direction of the force. [1]

Work function (Φ)* - The energy difference between an electron at rest at infinity and an electron at the Fermi level in the interior of a substance. It is thus the minimum energy required to remove an electron from the interior of a solid to a point just outside the surface. [1]

X unit (X) - A unit of length used in x-ray crystallography, equal to approximately 1.002×10^{-13} m.

X-ray photoelectron spectroscopy (XPS) - See Techniques for Materials Characterization, page 12-1.

Yield strength - The stress at which a material exhibits a specified deviation (often chosen as 0.2% for metals) from proportionality of stress and strain. [11]

Young's modulus (*E*) - In tension or compression of a body below its elastic limit, the ratio of stress to corresponding strain. Since strain is normally expressed on a fractional basis, Young's modulus has dimensions of pressure. Also called elastic modulus. [11]

Zeeman effect - The splitting of an energy level of an atom or molecule, and hence a splitting of spectral lines arising from that level, as a result of the application of an external magnetic field.

Zener diode - A control device utilizing a p-n junction with a well defined reverse-bias avalanche breakdown voltage.

Zeotrope - A liquid mixture that shows no maximum or minimum when vapor pressure is plotted against composition at constant temperature. See Azeotrope.

Zero-point energy - The energy possessed by a quantum mechanical system as a result of the uncertainty principle even when it is in its lowest energy state; e.g., the difference between the lowest energy level of a harmonic oscillator and the minimum in the potential well.

Zeta potential (ζ) - The electric potential at the surface of a colloidal particle relative to the potential in the bulk medium at a long distance. Also called electrokinetic potential.

Zwitterions - Neutral compounds having formal unit electrical charges of opposite sign. Some chemists restrict the term to compounds with the charges on non-adjacent atoms. Sometimes referred to as inner salts, dipolar ions (a misnomer). [5]

THERMODYNAMIC FUNCTIONS AND RELATIONS

p = pressure V = volume T = temperature
n_i = amount of substance i
$x_i = n_i/\Sigma_j n_j$ = mole fraction of substance i

Energy	U
Entropy	S
Enthalpy	$H = U + pV$
Helmholtz energy	$A = U - TS$
Gibbs energy	$G = U + pV - TS$
Isobaric heat capacity	$C_p = (\partial H/\partial T)_p$
Isochoric heat capacity	$C_V = (\partial U/\partial T)_V$
Isobaric expansivity	$\alpha = V^{-1}(\partial V/\partial T)_p$
Isothermal compressibility	$\kappa_T = -V^{-1}(\partial V/\partial p)_T$
Isentropic compressibility	$\kappa_S = -V^{-1}(\partial V/\partial p)_S$
	$\kappa_T - \kappa_S = T\alpha^2 V/C_p$
	$C_p - C_V = T\alpha^2 V/\kappa_T$
Gibbs-Helmholtz equation	$H = G - T(\partial G/\partial T)_p$
Maxwell relations	$(\partial S/\partial p)_T = -(\partial V/\partial T)_p$
	$(\partial S/\partial V)_T = -(\partial p/\partial T)_V$
Joule-Thomson expansion	$\mu_{JT} = (\partial T/\partial p)_H = -\{V - T(\partial V/\partial T)_p\}/C_p$
	$\phi_{JT} = (\partial H/\partial p)_T = V - T(\partial V/\partial T)_p$
Partial molar quantity	$X_i = (\partial X/\partial n_i)_{T,p,nj\neq i}$
Chemical potential	$\mu_i = (\partial G/\partial n_i)_{T,p,nj\neq i}$
Perfect gas [symbol pg]	$pV = (\Sigma_i n_i)RT$
	$\mu_i^{pg} = \mu_i^\theta + RT\ln(x_i p/p^\theta)$
Fugacity	$f_i = (x_i p)\exp\{(\mu_i - \mu_i^{pg})/RT\}$
Activity coefficient	$\gamma_i = f_i/(x_i f_i^\theta)$
Gibbs-Duhem relation	$0 = S\mathrm{d}T - V\mathrm{d}p + \Sigma_i n_i \mathrm{d}\mu_i$

[Superscript θ in above equations indicates standard state]

Notation for chemical and physical changes (X = H, S, G, etc.):

Chemical reaction	$\Delta_r X$
Formation from elements	$\Delta_f X$
Combustion	$\Delta_c X$
Fusion (cry→liq)	$\Delta_{fus} X$
Vaporization (liq→gas)	$\Delta_{vap} X$
Sublimation (cry→gas)	$\Delta_{sub} X$
Phase transition	$\Delta_{trs} X$
Solution	$\Delta_{sol} X$
Mixing	$\Delta_{mix} X$
Dilution	$\Delta_{dil} X$

PHYSICAL CONSTANTS OF ORGANIC COMPOUNDS

The basic physical constants and structure diagrams for about 10,900 organic compounds are presented in this table. An effort has been made to include the compounds most frequently encountered in the laboratory, the workplace, and the environment. Particular emphasis has been given to substances that are considered environmental or human health hazards. In making the selection of compounds for the table, added weight was assigned to the appearance of a compound in various lists or reference sources such as:

- Laboratory reagent lists, e.g., the ACS *Reagent Chemicals* volume (Ref. 1)
- The DIPPR list of industrially important compounds (Ref. 2) and the (much larger) TSCA Inventory of chemicals used in commerce
- The Hazardous Substance Data Bank (Ref. 3)
- The UNEP list of Persistent Organic Pollutants (Ref. 4)
- Chemicals on Reporting Rules (CORR), a database of about 7500 regulated compounds prepared by the Environmental Protection Agency (Ref. 5)
- The EPA Integrated Risk Information System (IRIS), a database of human health effects of exposure to chemicals in the environment (Ref. 6)
- Compendia of chemicals of biochemical or medical importance, such as *The Merck Index* (Ref. 10)
- Specialized tables in this *Handbook*

It should be noted that the above lists vary widely in their choice of chemical names, and even in the use of Chemical Abstracts Registry Numbers. To the extent possible, we have attempted to systematize the names and registry numbers for this table.

Clearly, criteria of this type are somewhat subjective, and compounds considered important by some users have undoubtedly been omitted. Suggestions for additional compounds or other improvements are welcomed.

The data in the table have been derived from many sources, including both the primary literature and evaluated compilations. The *Handbook of Data on Organic Compounds, Third Edition* (Reference 7) and the *Chapman & Hall/CRC Combined Chemical Dictionary* (Reference 8) were important sources. Other useful compilations of physical property data for organic compounds are listed in References 9-19. Many boiling point values (and some melting point and density values) were taken from recent physical chemistry literature dealing with fluid properties. Where conflicts were found, the value deemed most reliable was chosen.

The table is arranged alphabetically by substance name, which generally is either an IUPAC systematic name or, in the case of pesticides, pharmaceuticals, and other complex compounds, a simple trivial name. Names in ubiquitous use, such as acetic acid and formaldehyde, are adopted rather than their systematic equivalents. Synonyms are given in the column following the primary name, and structure diagrams are given on the page facing the data listing. The explanation of the data columns follows:

- **No.**: An identification number used in the indexes.
- **Name**: Primary name of the substance
- **Synonym**: A synonym in common use. When the primary name is non-systematic, a systematic name may appear here.
- **Mol. Form.**: The molecular formula written in the Hill convention.
- **CAS RN**: The Chemical Abstracts Service Registry Number for the compound.
- **Mol. Wt**: Molecular weight (relative molar mass) as calculated with the 2001 IUPAC Standard Atomic Weights.
- **Physical Form**: A notation of the physical phase, color, crystal type, or other features of the compound at ambient temperature. Abbreviations are given below.
- **mp**: Normal melting point in ˚C. A value is sometimes followed by "dec", indicating decomposition is observed at the stated temperature (so that it is probably not a true melting point). The notation "tp" indicates a triple point, where solid, liquid, and gas are in equilibrium.
- **bp**: Normal boiling point in ˚C, if it is available. This is the temperature at which the liquid phase is in equilibrium with the vapor at a pressure of 760 mmHg (101.325 kPa). A notation "sp" following the value indicates a sublimation point, where the vapor pressure of the solid phase reaches 760 mmHg. When a notation such as "dec" or "exp" (explodes) follows the value, the temperature may not be a true boiling point. A simply entry "sub" indicates the solid has a significant sublimation pressure at ambient temperatures. The boiling point at reduced pressure is listed in some cases, with or without the normal boiling point. Here the superscript indicates the pressure in mmHg.
- **den**: Density (mass per unit volume) in g/cm^3. The temperature in ˚C is indicated by a superscript. Values refer to the liquid or solid phase, and all values are true densities, not specific gravities. The number of decimal places gives a rough estimate of the accuracy of the value.
- n_D: Refractive index, at the temperature in ˚C indicated by the superscript. Unless otherwise indicated, all values refer to a wavelength of 589 nm (sodium D line). Values are given only for liquids and solids.
- **Solubility**: Qualitative indication of solubility in common solvents. Abbreviations are:

i	insoluble
sl	slightly soluble
s	soluble
vs	very soluble
msc	miscible
dec	decomposes

Abbreviations for solvents are given below.

In order to facilitate the location of compounds in the table, three indexes are provided:

- **Synonym Index**: Includes common synonyms, but not the primary name by which the table is arranged.
- **Molecular Formula Index**: Lists compounds by molecular formula in the Hill Order (see Preface to this *Handbook*).
- **CAS Registry Number Index**: Lists compounds by Chemical Abstracts Service Registry Number. Note there is some redundancy in this index, because many compounds have several Registry Numbers associated with them. Thus the CAS RN in a table entry may differ from the CAS RN that points to it in the index. For example, CAS RN 1319-77-3 in the index points to all three cresol isomers, each of which has its own specific CAS RN.

The assistance of Fiona Macdonald in checking names and formulas is gratefully acknowledged, as well as the efforts of Janice Shackleton, Trupti Desai, Nazila Kamaly, Matt Griffiths, and Lawrence Braschi in preparing the structure diagrams.

List of Abbreviations

Ac	acetyl
Ac_2O	acetic anhydride
AcOEt	ethyl acetate
ac	acid
ace	acetone
al	alcohol (ethanol)
alk	alkali
amor	amorphous
anh	anhydrous
aq	aqueous
bipym	bipyramidal
bl	blue
blk	black
bp	boiling point
br	brown
bt	bright
Bu	butyl
BuOH	1-butanol
bz	benzene
chl	chloroform
col	colorless
con, conc	concentrated
cry	crystals
ctc	carbon tetrachloride
cy, cyhex	cyclohexane
dec	decomposes
den	density
dil	dilute
diox	dioxane
dk	dark
DMF	dimethylformamide
DMSO	dimethyl sulfoxide
efflor	efflorescent
Et	ethyl
EtOH	ethanol
eth	diethyl ether
exp	explodes
fl	flakes
flr	fluorescent
fum	fumes, fuming
gl	glacial
gr	gray
gran	granular
grn	green
hex	hexagonal
HOAc	acetic acid
hp	heptane
hx	hexane
hyd	hydrate
hyg	hygroscopic
i	insoluble
i-	iso-
iso	isooctane
lf	leaves
lig	ligroin
liq	liquid
lo	long
mcl	monoclinic
Me	methyl
MeCN	acetonitrile
MeOH	methanol
misc, msc	miscible
mp	melting point
n	refractive index
nd	needles
oct	octahedra, octahedral
oran	orange
orth	orthorhombic
os	organic solvents
pa	pale
peth	petroleum ether
Ph	phenyl
PhCl	chlorobenzene
$PhNH_2$	aniline
$PhNO_2$	nitrobenzene
pl	plates
pow	powder
Pr	propyl
PrOH	1-propanol
pr	prisms
purp	purple
py	pyridine
pym	pyramids, pyramidal
reac	reacts
rhom	rhombic
s	soluble
sat	saturated
sc	scales
sl	slightly soluble
soln	solution
sp	sublimation point
stab	stable
sub	sublimes
sulf	sulfuric acid
syr	syrup
tab	tablets
tcl	triclinic
tetr	tetragonal
tfa	trifluoroacetic acid
thf, THF	tetrahydrofuran
tol	toluene
tp	triple point
trg	trigonal
unstab	unstable
vap	vapor
viol	violet
visc	viscous
vol	volatile
vs	very soluble
w	water
wh	white
xyl	xylene
ye	yellow

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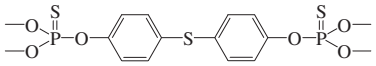
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
1	Abate	Temephos	$C_{16}H_{20}O_6P_2S_3$	3383-96-8	466.469		30		1.32		
2	Abietic acid		$C_{20}H_{30}O_2$	514-10-3	302.451	mcl pl (al-w)	173.5	250^{9}			vs ace, bz, eth, EtOH
3	Abscisic acid		$C_{15}H_{20}O_4$	21293-29-8	264.318	cry (chl-peth)	160	sub 120			vs ace, eth, chl
4	Acacetin	5,7-Dihydroxy-2-(4-methoxyphenyl)-4*H*-1-benzopyran-4-one	$C_{16}H_{12}O_5$	480-44-4	284.263	ye nd (95% al)	263				vs EtOH
5	Acebutolol, (±)		$C_{18}H_{28}N_2O_4$	37517-30-9	336.426	cry	121				
6	Acedapsone		$C_{16}H_{16}N_2O_4S$	77-46-3	332.374	pa ye nd (eth) lf (dil al)	290				sl H_2O
7	Acenaphthene	1,2-Dihydroacenaphthylene	$C_{12}H_{10}$	83-32-9	154.207		93.4	279	1.222^{20}	1.6048^{95}	i H_2O; sl EtOH, chl; vs bz; s HOAc
8	Acenaphthylene	Acenaphthalene	$C_{12}H_8$	208-96-8	152.192		91.8	280	0.8987^{16}		i H_2O; vs EtOH, eth, bz; sl chl
9	1,2-Acenaphthylenedione		$C_{12}H_6O_2$	82-86-0	182.175	ye nd (HOAc)	261	sub	1.4800^{20}		i H_2O; sl EtOH, bz, HOAc; s lig
10	Acenocoumarol	Nicoumalone	$C_{19}H_{15}NO_6$	152-72-7	353.325	cry (ace aq)	198				i H_2O
11	Acephate	Phosphoramidothioic acid, acetyl-, *O,S*-dimethyl ester	$C_4H_{10}NO_3PS$	30560-19-1	183.166		88		1.35^{20}		
12	Acepromazine		$C_{19}H_{22}N_2OS$	61-00-7	326.455	oran oil		$230^{0.5}$			
13	Acesulfame		$C_4H_5NO_4S$	33665-90-6	163.153	nd (bz)	123.2				s bz, chl
14	Acetaldehyde	Ethanal	C_2H_4O	75-07-0	44.052	vol liq or gas	-123.37	20.1	0.7834^{18}	1.3316^{20}	msc H_2O, EtOH, eth, bz; sl chl
15	Acetaldehyde phenylhydrazone		$C_8H_{10}N_2$	935-07-9	134.178		99.5	150^{40}, 135^{21}			vs EtOH
16	Acetaldoxime	Acetaldehyde oxime	C_2H_5NO	107-29-9	59.067	nd	45	115	0.9656^{20}	1.4264^{20}	s H_2O, chl; msc EtOH, eth
17	Acetamide	Ethanamide	C_2H_5NO	60-35-5	59.067	trg mcl (al-eth)	80.16	222.0	0.9986^{85}	1.4278	vs H_2O, EtOH
18	Acetanilide	*N*-Phenylacetamide	C_8H_9NO	103-84-4	135.163		114.3	304	1.2190^{15}		sl H_2O; vs EtOH, ace; s eth, s bz, tol
19	Acetazolamide	*N*-[5-(Aminosulfonyl)-1,3,4-thiadiazol-2-yl]acetamide	$C_4H_6N_4O_3S_2$	59-66-5	222.246		260.5				sl H_2O
20	Acethion		$C_8H_{17}O_4PS_2$	919-54-0	272.322	liq		$137^{1.5}$	1.18^{20}		
21	Acetic acid	Ethanoic acid	$C_2H_4O_2$	64-19-7	60.052		16.64	117.9	1.0446^{25}	1.3720^{20}	msc H_2O, EtOH, eth, ace, bz; s chl, CS_2
22	Acetic acid, 2-phenylhydrazide		$C_8H_{10}N_2O$	114-83-0	150.177	hex pr (eth)	130.0				vs H_2O, EtOH; sl eth, chl, tfa; s bz
23	Acetic anhydride		$C_4H_6O_3$	108-24-7	102.089	liq	-74.1	139.5	1.082^{20}	1.3901^{20}	vs H_2O; s EtOH, bz; msc eth; sl ctc
24	Acetoacetanilide		$C_{10}H_{11}NO_2$	102-01-2	177.200	pr or nd (bz or lig)	86				sl H_2O; s EtOH, eth, bz, chl, acid, lig
25	Acetoacetic acid		$C_4H_6O_3$	541-50-4	102.089	cry (eth)	36.5	dec 100			vs H_2O, eth, EtOH
26	2-Acetoacetoxyethyl methacrylate	2-(Methacryloyloxy)ethyl acetoacetate	$C_{10}H_{14}O_5$	21282-97-3	214.215	liq		$100^{0.8}$	1.122	1.4560^{20}	
27	Acetochlor		$C_{14}H_{20}ClNO_2$	34256-82-1	269.768	ye liq		$134^{0.4}$		1.5272^{20}	sl H_2O
28	Acetohexamide		$C_{15}H_{20}N_2O_4S$	968-81-0	324.396	cry (EtOH aq)	188				i H_2O, eth; sl EtOH, chl; s py
29	Acetohydrazide		$C_2H_6N_2O$	1068-57-1	74.081		67	137^{25}			s H_2O, EtOH; sl eth
30	Acetohydroxamic acid	*N*-Hydroxyacetamide	$C_2H_5NO_2$	546-88-3	75.067	hyg cry	90				
31	1-Acetonaphthone		$C_{12}H_{10}O$	941-98-0	170.206		34	297	1.1171^{21}	1.6280^{22}	i H_2O; s EtOH, eth, ace, chl
32	2-Acetonaphthone		$C_{12}H_{10}O$	93-08-3	170.206	nd (lig, dil al)	56	302			sl EtOH, ctc
33	Acetone	2-Propanone	C_3H_6O	67-64-1	58.079	liq	-94.7	56.05	0.7845^{25}	1.3588^{20}	msc H_2O, EtOH, eth, ace, bz, chl
34	Acetone cyanohydrin		C_4H_7NO	75-86-5	85.105		-19	82^{23}	0.932^{19}	1.3992^{20}	vs H_2O, EtOH, eth; s ace, bz, chl; i peth
35	Acetone (2,4-dinitrophenyl) hydrazone		$C_9H_{10}N_4O_4$	1567-89-1	238.200	ye nd or pl (al)	128				i H_2O; s EtOH, eth, bz, chl, AcOEt
36	Acetone (1-methylethylidene) hydrazone	Dimethyl ketazine	$C_6H_{12}N_2$	627-70-3	112.172	liq	-12.5	133	0.8390^{20}	1.4535^{20}	msc H_2O, EtOH, eth; s ace
37	Acetone thiosemicarbazide		$C_4H_9N_3S$	1752-30-3	131.199	ye cry	176				s ace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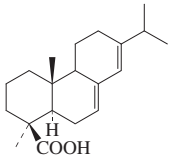
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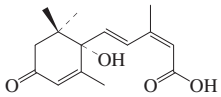
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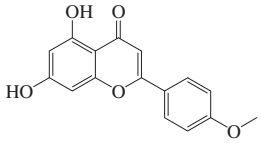
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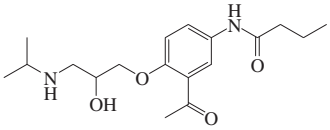
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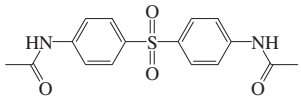
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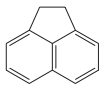
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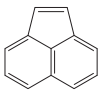
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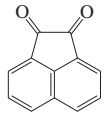
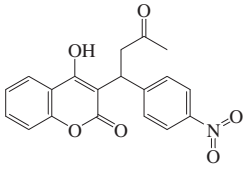
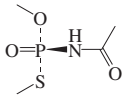
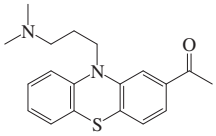
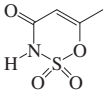

1,2-Acenaphthylenedione

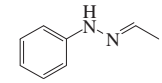

Acenocoumarol


Acephate


Acepromazine

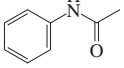

Acesulfame

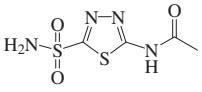

Acetaldehyde

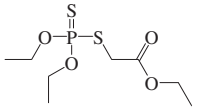

Acetaldehyde phenylhydrazone


Acetaldoxime

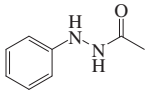

Acetamide

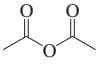

Acetanilide

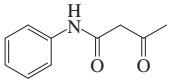

Acetazolamide

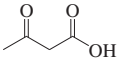

Acethion

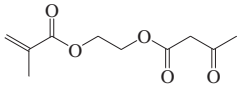

Acetic acid

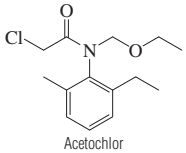

Acetic acid, 2-phenylhydrazide

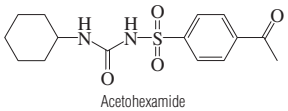

Acetic anhydride

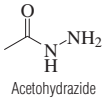

Acetoacetanilide

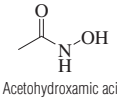

Acetoacetic acid

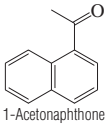

2-Acetoacetoxyethyl methacrylate

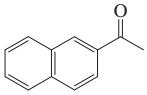

Acetochlor


Acetohexamide


Acetohydrazide

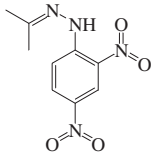

Acetohydroxamic acid

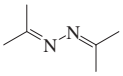

1-Acetonaphthone

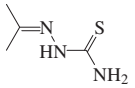

2-Acetonaphthone


Acetone


Acetone cyanohydrin

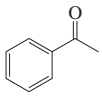

Acetone (2,4-dinitrophenyl)hydrazone

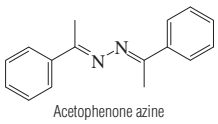

Acetone (1-methylethylidene)hydrazone

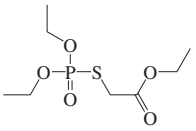

Acetone thiosemicarbazide

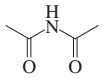
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
38	Acetonitrile	Methyl cyanide	C_2H_3N	75-05-8	41.052	liq	-43.82	81.65	0.7857^{20}	1.3442^{30}	msc H_2O, EtOH, eth, ace, bz, ctc
39	Acetophenone	Methyl phenyl ketone	C_8H_8O	98-86-2	120.149	mcl pr or pl	20.5	202	1.0281^{20}	1.5372^{20}	sl H_2O; s EtOH, eth, ace, bz, con sulf, chl
40	Acetophenone azine	Methylphenyl ketazine	$C_{16}H_{16}N_2$	729-43-1	236.311		120				
41	Acetoxon	Acetophos	$C_8H_{17}O_5PS$	2425-25-4	256.257	liq		$73^{0.005}$			
42	*N*-Acetylacetamide		$C_4H_7NO_2$	625-77-4	101.105	nd (eth)	79	223.5			s H_2O, EtOH, eth, chl, lig
43	*N*-Acetyl-*L*-alanine		$C_5H_9NO_3$	97-69-8	131.130		125				
44	4-(Acetylamino)benzenesulfonyl chloride	Acetylsulfanilyl chloride	$C_8H_8ClNO_3S$	121-60-8	233.673	nd (bz), pr (bz-chl)	149				vs EtOH, eth; s bz, chl
45	2-(Acetylamino)benzoic acid		$C_9H_9NO_3$	89-52-1	179.172	nd (HOAc)	187.5				sl H_2O; s EtOH; vs eth, ace, bz, HOAc
46	4-(Acetylamino)benzoic acid		$C_9H_9NO_3$	556-08-1	179.172	nd (HOAc)	256.5				i H_2O; s EtOH; sl eth, tfa
47	2-(Acetylamino)-2-deoxy-*D*-glucose	*N*-Acetyl-*D*-glucosamine	$C_8H_{15}NO_6$	7512-17-6	221.208		205				
48	2-(Acetylamino)-2-deoxy-*D*-mannose	*N*-Acetyl-*D*-mannosamine	$C_8H_{15}NO_6$	3615-17-6	221.208	cry (ace aq)	128				dec alk
49	2-(Acetylamino)fluorene		$C_{15}H_{13}NO$	53-96-3	223.270	cry (dil al)	193				i H_2O; s EtOH, eth, HOAc
50	4-(Acetylamino)fluorene		$C_{15}H_{13}NO$	28322-02-3	223.270	br cry (bz)	200				
51	6-(Acetylamino)hexanoic acid	ε-Acetamidocaproic acid	$C_8H_{15}NO_3$	57-08-9	173.210	cry (ace)	104.5				
52	4-Acetylanisole		$C_9H_{10}O_2$	100-06-1	150.174	pl (peth)	38.5	258	1.0818^{41}	1.547^{41}	sl H_2O; s EtOH, eth, ace, chl
53	2-Acetylbenzoic acid		$C_9H_8O_3$	577-56-0	164.158	nd (w), pr (bz)	114.5	111^{2}			vs H_2O, eth, EtOH
54	3-Acetylbenzoic acid		$C_9H_8O_3$	586-42-5	164.158		172	111^{2}			s H_2O; msc EtOH
55	4-Acetylbenzoic acid		$C_9H_8O_3$	586-89-0	164.158	nd (w)	208	sub			vs H_2O
56	Acetyl benzoylperoxide	Acetozone	$C_9H_8O_4$	644-31-5	180.158	wh nd (lig)	37	130^{19}			vs eth
57	Acetyl bromide	Ethanoyl bromide	C_2H_3BrO	506-96-7	122.948	liq	-96	76	1.6625^{16}	1.4486^{20}	msc eth, bz, chl; s ace
58	Acetyl chloride	Ethanoyl chloride	C_2H_3ClO	75-36-5	78.497	liq	-112.8	50.7	1.1051^{20}	1.3886^{20}	msc eth, ace, bz, chl; s ctc
59	Acetylcholine bromide		$C_7H_{16}BrNO_2$	66-23-9	226.112	hyg cry	146				vs H_2O
60	Acetylcholine chloride		$C_7H_{16}ClNO_2$	60-31-1	181.661		150				s H_2O, EtOH; i eth
61	Acetylcholine iodide		$C_7H_{16}INO_2$	2260-50-6	273.112	hyg	163				
62	2-Acetylcyclohexanone		$C_8H_{12}O_2$	874-23-7	140.180		-11	112^{18}, 101^{14}	1.0782^{25}	1.5138^{20}	s ctc
63	2-Acetylcyclopentanone		$C_7H_{10}O_2$	1670-46-8	126.153			73^{20}	1.0431^{25}	1.4906^{20}	
64	*N*-Acetyl-*L*-cysteine	Acetylcysteine	$C_5H_9NO_3S$	616-91-1	163.195	cry (w)	109.5				
65	3-Acetyldihydro-2(3*H*)-furanone	α-Acetylbutyrolactone	$C_6H_8O_3$	517-23-7	128.126			107^{5}	1.1846^{20}	1.4585^{20}	vs H_2O
66	1-Acetyl-2,5-dihydroxybenzene	2,5-Dihydroxyacetophenone	$C_8H_8O_3$	490-78-8	152.148	ye grn nd (dil al or w)	205.3				sl H_2O, eth, bz; s EtOH
67	Acetylene	Ethyne	C_2H_2	74-86-2	26.037	col gas	-80.7 (triple point)	-84.7 sp	0.377^{25} (p>1 atm)		sl H_2O, EtOH, CS_2; s ace, bz, chl
68	*N*-Acetylethanolamine		$C_4H_9NO_2$	142-26-7	103.120		63.5	166^{8}	1.1079^{25}	1.4674^{20}	msc H_2O; s ace; sl bz, lig
69	Acetyl fluoride	Ethanoyl fluoride	C_2H_3FO	557-99-3	62.042	vol liq or gas	-84	20.8	1.032^{25}		msc EtOH, eth; s bz, chl; sl CS_2
70	*N*-Acetylglutamic acid		$C_7H_{11}NO_5$	1188-37-0	189.166	pr (w)	199				s H_2O, EtOH
71	*N*-Acetylglycine	Aceturic acid	$C_4H_7NO_3$	543-24-8	117.104	lo nd (w, MeOH)	206				vs H_2O, ace, EtOH
72	*trans*-1-Acetyl-4-hydroxy-*L*-proline	Oxaceprol	$C_7H_{11}NO_4$	33996-33-7	173.167	cry (Ac)	132				vs H_2O, MeOH
73	1-Acetyl-1*H*-imidazole		$C_5H_6N_2O$	2466-76-4	110.114		104.5				sl H_2O; s EtOH, eth, chl, THF
74	Acetyl iodide	Ethanoyl iodide	C_2H_3IO	507-02-8	169.948			108	2.0673^{20}	1.5491^{20}	vs eth
75	Acetyl isothiocyanate		C_3H_3NOS	13250-46-9	101.127			132.5	1.1523^{13}	1.5231^{18}	s eth, CS_2
76	*N*6-Acetyl-*L*-lysine		$C_8H_{16}N_2O_3$	692-04-6	188.224		265 dec				
77	*N*-Acetyl-*DL*-methionine		$C_7H_{13}NO_3S$	1115-47-5	191.248		114.5				
78	*N*-Acetyl-*L*-methionine	Methionamine	$C_7H_{13}NO_3S$	65-82-7	191.248		105.5				
79	1-Acetyl-17-methoxyaspidospermidine	Aspidospermine	$C_{22}H_{30}N_2O_2$	466-49-9	354.485	nd or pr (al) nd (peth)	208	220^{2}			sl H_2O, eth; s EtOH, bz, chl
80	*N*-Acetyl-*N*-methylacetamide		$C_5H_9NO_2$	1113-68-4	115.131	liq	-25	195; 114.5^{61}	1.0663^{25}	1.4502^{25}	msc H_2O; i eth
81	1-Acetyl-3-methylpiperidine		$C_8H_{15}NO$	4593-16-2	141.211	liq	-13.6	239	0.9684^{25}	1.4731^{25}	vs H_2O
82	3-Acetyl-6-methyl-2*H*-pyran-2,4(3*H*)-dione	Dehydroacetic acid	$C_8H_8O_4$	520-45-6	168.148		109	270			vs H_2O, eth; sl EtOH, chl

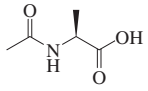
Acetonitrile

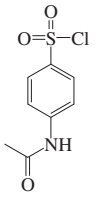

Acetophenone

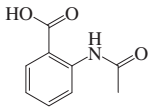

Acetophenone azine

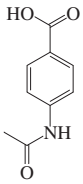

Acetoxon

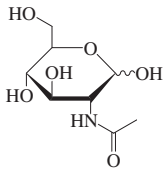

N-Acetylacetamide

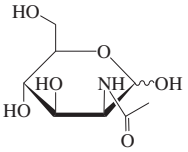

N-Acetyl-*L*-alanine

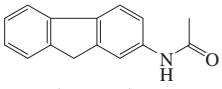

4-(Acetylamino)benzenesulfonyl chloride

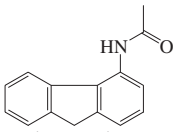

2-(Acetylamino)benzoic acid

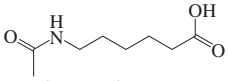

4-(Acetylamino)benzoic acid

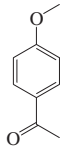

2-(Acetylamino)-2-deoxy-*D*-glucose

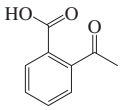

2-(Acetylamino)-2-deoxy-*D*-mannose

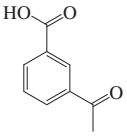

2-(Acetylamino)fluorene

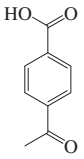

4-(Acetylamino)fluorene

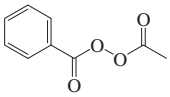

6-(Acetylamino)hexanoic acid


4-Acetylanisole


2-Acetylbenzoic acid

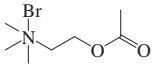

3-Acetylbenzoic acid

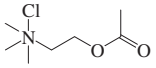

4-Acetylbenzoic acid

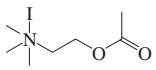

Acetyl benzoylperoxide

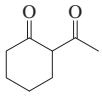

Acetyl bromide

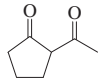

Acetyl chloride

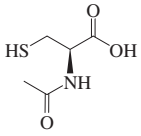

Acetylcholine bromide

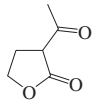

Acetylcholine chloride

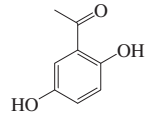

Acetylcholine iodide


2-Acetylcyclohexanone

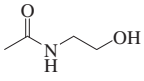

2-Acetylcyclopentanone


N-Acetyl-*L*-cysteine

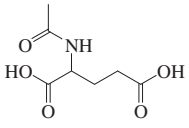

3-Acetyldihydro-2(3*H*)-furanone

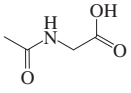

1-Acetyl-2,5-dihydroxybenzene

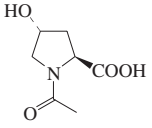
Acetylene

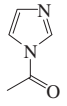

N-Acetylethanolamine


Acetyl fluoride

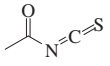

N-Acetylglutamic acid

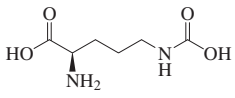

N-Acetylglycine

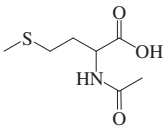

trans-1-Acetyl-4-hydroxy-*L*-proline


1-Acetyl-1*H*-imidazole


Acetyl iodide


Acetyl isothiocyanate


*N*6-Acetyl-*L*-lysine


N-Acetyl-*DL*-methionine

N-Acetyl-*L*-methionine

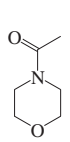
1-Acetyl-17-methoxyaspidospermidine

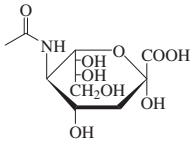
N-Acetyl-*N*-methylacetamide

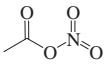
1-Acetyl-3-methylpiperidine

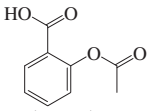
3-Acetyl-6-methyl-2*H*-pyran-2,4(3*H*)-dione

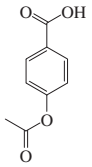
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
83	4-Acetylmorpholine		$C_6H_{11}NO_2$	1696-20-4	129.157		14.5	152^{50}, 118^{12}	1.1145^{20}	1.4827^{20}	msc H_2O; s EtOH, ace, ctc
84	*N*-Acetylneuraminic acid	Aceneuramic acid	$C_{11}H_{19}NO_9$	131-48-6	309.271		186				
85	Acetyl nitrate		$C_2H_3NO_4$	591-09-3	105.050			exp 60; 22^{70}	1.24^{15}		
86	2-(Acetyloxy)benzoic acid	Acetylsalicylic acid	$C_9H_8O_4$	50-78-2	180.158	nd (w), mcl tab (w)	135				s H_2O, eth, chl; vs EtOH; sl bz
87	4-(Acetyloxy)benzoic acid		$C_9H_8O_4$	2345-34-8	180.158		188.5				
88	2-(Acetyloxy)-5-bromobenzoic acid	5-Bromoacetylsalicylic acid	$C_9H_7BrO_4$	1503-53-3	259.054	nd (al)	60				i H_2O; vs EtOH, eth
89	4-(Acetyloxy)-3-methoxybenzaldehyde		$C_{10}H_{10}O_4$	881-68-5	194.184		78				sl H_2O; vs EtOH, eth
90	2-(Acetyloxy)-1-phenylethanone		$C_{10}H_{10}O_3$	2243-35-8	178.184	orth pl	49	270	1.1169^{65}	1.5036^{65}	i H_2O; vs EtOH, eth, chl; sl bz, lig
91	1-(Acetyloxy)-2-propanone	Acetoxyacetone	$C_5H_8O_3$	592-20-1	116.116			171; 63^{11}	1.0757^{20}	1.4141^{20}	vs H_2O, eth, EtOH
92	(Acetyloxy)tributylstannane	Tributyltin acetate	$C_{14}H_{30}O_2Sn$	56-36-0	349.097		84.7				
93	(Acetyloxy)triphenylstannane	Triphenyltin acetate	$C_{20}H_{18}O_2Sn$	900-95-8	409.066		121.5				
94	4-Acetylphenyl acetate		$C_{10}H_{10}O_3$	13031-43-1	178.184						s ctc, CS_2
95	*N*-Acetyl-*L*-phenylalanine		$C_{11}H_{13}NO_3$	2018-61-3	207.226		173.5				s EtOH
96	*N*-Acetyl-*L*-phenylalanine, ethyl ester		$C_{13}H_{17}NO_3$	2361-96-8	235.279	cry (EtOH aq)	93				
97	*N*-Acetyl-*L*-phenylalanine, methyl ester		$C_{12}H_{15}NO_3$	3618-96-0	221.252	nd (peth) or visc oil (chl)	91				
98	Acetyl phosphate		$C_2H_5O_5P$	590-54-5	140.032	unstab in soln					
99	1-Acetylpiperidine		$C_7H_{13}NO$	618-42-8	127.184	liq	-13.4	226.5	1.011^{9}	1.4790^{25}	vs H_2O, EtOH
100	1-Acetyl-4-piperidinone		$C_7H_{11}NO_2$	32161-06-1	141.168			218; $124^{0.2}$	1.146^{25}	1.5026^{20}	
101	3-Acetylpyridine adenine dinucleotide	3-Acetyl NAD	$C_{22}H_{28}N_6O_{14}P_2$	86-08-8	662.436	solid					
102	4-Acetylthioanisole		$C_9H_{10}OS$	1778-09-2	166.239		81.5				
103	Acetyl thiocholine iodide		$C_7H_{16}INOS$	1866-15-5	289.177		205				
104	*N*-Acetyl-*L*-tryptophan		$C_{13}H_{14}N_2O_3$	1218-34-4	246.261	nd (dil MeOH)	189.5				s H_2O, EtOH, alk
105	*N*-Acetyl-*L*-tyrosine		$C_{11}H_{13}NO_4$	537-55-3	223.226	cry (w); pl (diox)	153				
106	*N*-Acetyl-*L*-tyrosine ethyl ester		$C_{13}H_{17}NO_4$	840-97-1	251.279		80.5				
107	*N*-Acetyl-*L*-valine		$C_7H_{13}NO_3$	96-81-1	159.183		164				
108	Acid Fuchsin	Fuchsin, acid	$C_{20}H_{17}N_3Na_2O_9S_3$	3244-88-0	585.539						sl H_2O, EtOH
109	Acifluorfen	5-[2-Chloro-4-(trifluoromethyl) phenoxy]-2-nitrobenzoic acid	$C_{14}H_7ClF_3NO_5$	50594-66-6	361.658		150				
110	Aconine		$C_{25}H_{41}NO_9$	509-20-6	499.596	amor	132				s H_2O, EtOH, chl; sl eth, lig
111	Aconitine		$C_{34}H_{47}NO_{11}$	302-27-2	645.737	orth lf	204				vs bz, EtOH, chl
112	9-Acridinamine	Aminacrine	$C_{13}H_{10}N_2$	90-45-9	194.231	ye nd (ace or al)	241				s EtOH, ace; sl DMSO; vs dil HCl
113	Acridine	Dibenzo[b,e]pyridine	$C_{13}H_9N$	260-94-6	179.217	orth nd or pr (al)	106(form a); 110(form b)	344.86	1.005^{20}		i H_2O; sl ctc; vs EtOH, eth, bz
114	3,6-Acridinediamine	Proflavine	$C_{13}H_{11}N_3$	92-62-6	209.246	ye nd (al or w)	285				s H_2O; vs EtOH; sl eth, bz
115	9(10*H*)-Acridinone		$C_{13}H_9NO$	578-95-0	195.216	ye lf (al)	>300				i H_2O, eth, bz; sl EtOH; s HOAc, alk
116	Acrolein	2-Propenal	C_3H_4O	107-02-8	56.063	liq	-87.7	52.6	0.840^{20}	1.4017^{20}	vs H_2O; s EtOH, eth, ace; sl chl
117	Acrylamide	2-Propenamide	C_3H_5NO	79-06-1	71.078	lf (bz)	84.5	192.6			vs H_2O, chl; s EtOH, eth, ace
118	Acrylic acid	2-Propenoic acid	$C_3H_4O_2$	79-10-7	72.063		12.5	141	1.0511^{20}	1.4224^{20}	msc H_2O, EtOH, eth; s ace, bz, ctc
119	Acrylonitrile	Propenenitrile	C_3H_3N	107-13-1	53.063	liq	-83.48	77.3	0.8007^{25}	1.3911^{20}	s H_2O; vs ace, bz, eth, EtOH
120	Acyclovir		$C_8H_{11}N_5O_3$	59277-89-3	225.205	cry (EtOH)	225				
121	Adenine	1*H*-Purin-6-amine	$C_5H_5N_5$	73-24-5	135.128	orth nd (+3w)	360 dec	sub 220			s H_2O; sl EtOH; i eth, chl
122	Adenosine	β-*D*-Ribofuranoside, adenine-9	$C_{10}H_{13}N_5O_4$	58-61-7	267.242	n(w+3/2)	235.5				sl H_2O; i EtOH
123	Adenosine cyclic 3',5'-(hydrogen phosphate)	cAMP	$C_{10}H_{12}N_5O_6P$	60-92-4	329.206	cry	219				
124	Adenosine 3',5'-diphosphate	3'-Adenylic acid, 5'-(dihydrogen phosphate)	$C_{10}H_{15}N_5O_{10}P_2$	1053-73-2	427.202	amor pow					

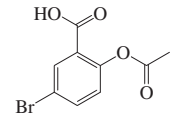

4-Acetylmorpholine

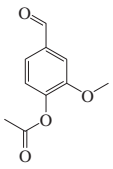

N-Acetylneuraminic acid

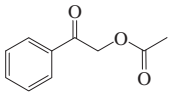

Acetyl nitrate

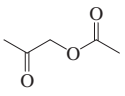

2-(Acetyloxy)benzoic acid

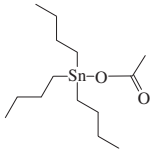

4-(Acetyloxy)benzoic acid

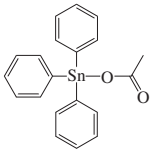

2-(Acetyloxy)-5-bromobenzoic acid

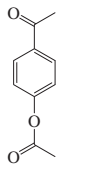

4-(Acetyloxy)-3-methoxybenzaldehyde

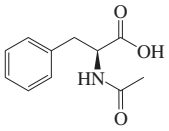

2-(Acetyloxy)-1-phenylethanone

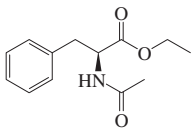

1-(Acetyloxy)-2-propanone

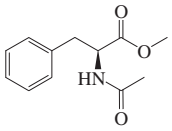

(Acetyloxy)tributylstannane

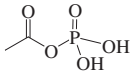

(Acetyloxy)triphenylstannane

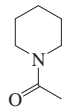

4-Acetylphenyl acetate

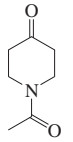

N-Acetyl-*L*-phenylalanine

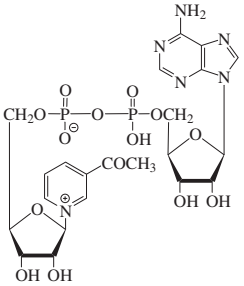

N-Acetyl-*L*-phenylalanine, ethyl ester

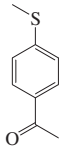

N-Acetyl-*L*-phenylalanine, methyl ester

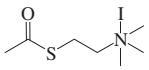

Acetyl phosphate

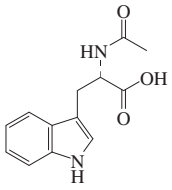

1-Acetylpiperidine

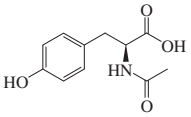

1-Acetyl-4-piperidinone

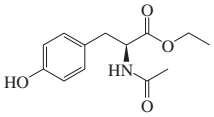

3-Acetylpyridine adenine dinucleotide

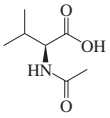

4-Acetylthioanisole

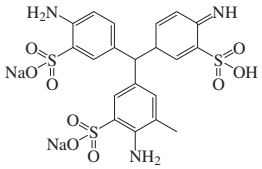

Acetyl thiocholine iodide

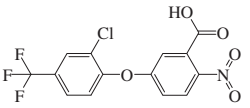

N-Acetyl-*L*-tryptophan

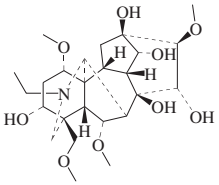

N-Acetyl-*L*-tyrosine

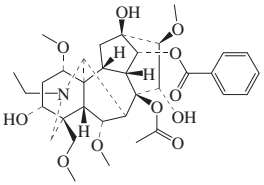

N-Acetyl-*L*-tyrosine ethyl ester

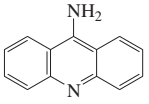

N-Acetyl-*L*-valine

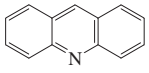

Acid Fuchsin

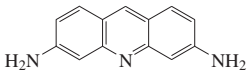

Acifluorfen

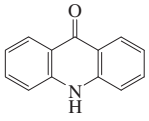

Aconine


Aconitine

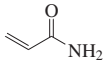

9-Acridinamine

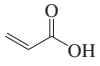

Acridine


3,6-Acridinediamine

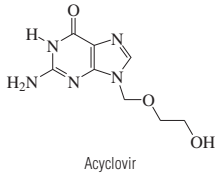

9(10*H*)-Acridinone

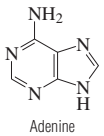

Acrolein

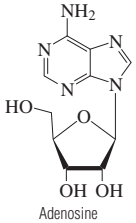

Acrylamide


Acrylic acid


Acrylonitrile


Acyclovir

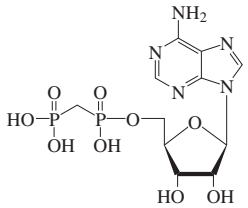

Adenine

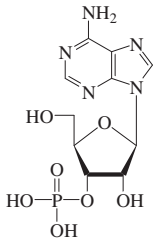

Adenosine

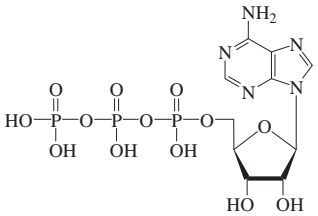
Adenosine cyclic 3',5'-(hydrogen phosphate)

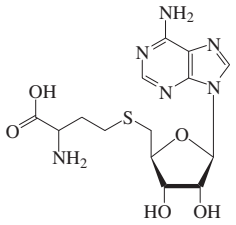
Adenosine 3',5'-diphosphate

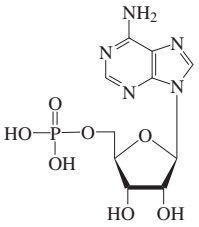
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
125	Adenosine 5'-methylenediphosphonate	Adenosine, 5'-[hydrogen (phosphonomethyl) phosphonate]	$C_{11}H_{17}N_5O_9P_2$	3768-14-7	425.229	cry (w)	204				s H_2O
126	Adenosine 3'-phosphate	3'-Adenylic acid	$C_{10}H_{14}N_5O_7P$	84-21-9	347.222	col nd	195 dec				
127	Adenosine 5'-triphosphate	ATP	$C_{10}H_{16}N_5O_{13}P_3$	56-65-5	507.181		144 dec				
128	*S*-Adenosyl-*L*-homocysteine		$C_{14}H_{20}N_6O_5S$	979-92-0	384.411		210 dec				
129	5'-Adenylic acid	Adenosine 5'-monophosphate	$C_{10}H_{14}N_5O_7P$	61-19-8	347.222		195 dec				vs H_2O; s EtOH, 10% HCl
130	Adipamic acid		$C_6H_{11}NO_3$	334-25-8	145.156	nd (w)	161.5				
131	Adiphenine hydrochloride		$C_{20}H_{26}ClNO_2$	50-42-0	347.879	cry	113.5				vs H_2O; sl EtOH, eth
132	Adipic acid	1,6-Hexanedioic acid	$C_6H_{10}O_4$	124-04-9	146.141	mcl pr (w, ace, lig)	152.5	337.5	1.360^{25}		sl H_2O; vs EtOH; s eth; i HOAc, lig
133	Adiponitrile	Hexanedinitrile	$C_6H_8N_2$	111-69-3	108.141	nd (eth)	1	295	0.9676^{20}	1.4380^{20}	sl H_2O, eth; s chl, EtOH
134	Adrenalone		$C_9H_{11}NO_3$	99-45-6	181.188	nd	235 dec				sl H_2O, EtOH, eth
135	Affinin	*N*-(2-Methylpropyl)-2,6,8-decatrienamide	$C_{14}H_{23}NO$	25394-57-4	221.339	ye oil	23	$162^{0.5}$		1.5134^{25}	i H_2O
136	Aflatoxin B1		$C_{17}H_{12}O_6$	1162-65-8	312.273	cry	268				
137	Aflatoxin B2		$C_{17}H_{14}O_6$	7220-81-7	314.289		287.5				
138	Aflatoxin G1		$C_{17}H_{12}O_7$	1165-39-5	328.273	cry	245				
139	Agaritine	*L*-Glutamic acid, 5-[2-[4-(hydroxymethyl)phenyl] hydrazide]	$C_{12}H_{17}N_3O_4$	2757-90-6	267.281	cry (dil al)	207 dec				vs H_2O
140	Ajmalan-17,21-diol, (17*R*,21α)	Ajmaline	$C_{20}H_{26}N_2O_2$	4360-12-7	326.432	pl (+3.5w) (aq AcOEt)	206				i H_2O; s EtOH, chl; sl eth, bz
141	Alachlor		$C_{14}H_{20}ClNO_2$	15972-60-8	269.768		40	$100^{0.02}$	1.133^{25}		
142	*DL*-Alanine	*DL*-2-Aminopropanoic acid	$C_3H_7NO_2$	302-72-7	89.094	orth pr or nd (w)	300 dec	sub 250	1.424^{25}		s H_2O; vs EtOH
143	*D*-Alanine	2-Aminopropanoic acid, (*R*)	$C_3H_7NO_2$	338-69-2	89.094	nd (w, al)	314 dec	sub			s H_2O; sl EtOH; i eth
144	*L*-Alanine	2-Aminopropanoic acid, (*S*)	$C_3H_7NO_2$	56-41-7	89.094	orth (w)	297 dec	sub 250	1.432^{22}		s H_2O; sl EtOH, py; i eth, ace
145	β-Alanine	3-Aminopropanoic acid	$C_3H_7NO_2$	107-95-9	89.094	nd, orth pr (al)	200 dec		1.437^{19}		s H_2O; sl EtOH; i eth, ace
146	Alantolactone		$C_{15}H_{20}O_2$	546-43-0	232.319	nd	76	275			vs bz, eth, EtOH, chl
147	Aldicarb		$C_7H_{14}N_2O_2S$	116-06-3	190.263		99		1.195^{25}		
148	Aldosterone		$C_{21}H_{28}O_5$	52-39-1	360.444	cry (HOAc)	166.5				
149	Aldoxycarb *S,S*-dioxide		$C_7H_{14}N_2O_4S$	1646-88-4	222.262	cry	141				sl H_2O
150	Aldrin		$C_{12}H_8Cl_6$	309-00-2	364.910		104				i H_2O; s EtOH, eth, ace, bz
151	Alizarin	1,2-Dihydroxy-9,10-anthracenedione	$C_{14}H_8O_4$	72-48-0	240.212	oran or red tcl nd or pr (al)	289.5				sl H_2O; s EtOH, eth, ace, bz; i chl
152	Alizarin Red S	Sodium alizarinesulfonate	$C_{14}H_7NaO_7S$	130-22-3	342.257						vs H_2O; s EtOH
153	Alizarin Yellow R		$C_{13}H_9N_3O_5$	2243-76-7	287.227	oran-br nd (dil HOAc)	253 dec				vs H_2O, EtOH
154	Alizurol purple	1-Hydroxy-4-[(4-methylphenyl) amino]-9,10-anthracenedione	$C_{21}H_{15}NO_3$	81-48-1	329.349	flat viol nd					s H_2SO_4
155	Alkannin		$C_{16}H_{16}O_5$	23444-65-7	288.295	br-red pr (bz)	149	sub 140			vs EtOH
156	Allantoic acid	Bis[(aminocarbonyl)amino] acetic acid	$C_4H_8N_4O_4$	99-16-1	176.132	nd	170 dec				sl H_2O, os, dil acid
157	Allantoin		$C_4H_6N_4O_3$	97-59-6	158.116	mcl pl or	239				sl H_2O; s EtOH, NaOH; i eth, MeOH
158	Allene		C_3H_4	463-49-0	40.064	col gas	-136.6	-34.4	0.584^{25} (p>1 atm)	1.4168	vs bz, peth
159	Allethrin		$C_{19}H_{26}O_3$	584-79-2	302.407				1.010^{20}		
160	Allicin		$C_6H_{10}OS_2$	539-86-6	162.272			dec	1.112^{20}	1.561^{20}	vs H_2O
161	Allopregnane-3β,21-diol-11,20-dione		$C_{21}H_{32}O_4$	566-02-9	348.477	cry (aq, ac, +w) nd (bz, ac)	190				
162	Allopregnan-20β-ol-3-one	5α-Pregnan-20β-ol-3-one	$C_{21}H_{34}O_2$	516-58-5	318.494		185				
163	Allopurinol	1,5-Dihydro-4*H*-pyrazolo[3,4-d] pyrimidin-4-one	$C_5H_4N_4O$	315-30-0	136.112	cry	350				
164	*D*-Allose		$C_6H_{12}O_6$	2595-97-3	180.155	cry (w)	128				vs H_2O
165	Alloxanic acid		$C_4H_4N_2O_5$	470-44-0	160.085	tcl pr (eth)	162 dec				vs H_2O, EtOH
166	Alloxantin		$C_8H_6N_4O_8$	76-24-4	286.156	orth pr (w+2)	254 dec				sl H_2O, EtOH, eth

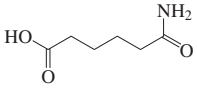

Adenosine 5'-methylenediphosphonate

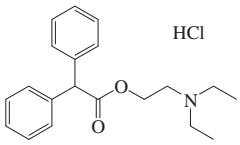

Adenosine 3'-phosphate

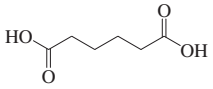

Adenosine 5'-triphosphate

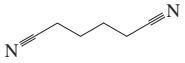

S-Adenosyl-*L*-homocysteine

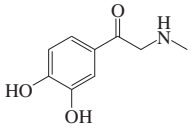

5'-Adenylic acid


Adipamic acid


Adiphenine hydrochloride


Adipic acid


Adiponitrile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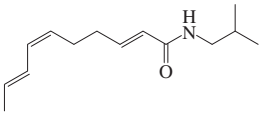
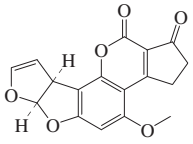
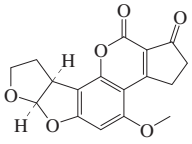
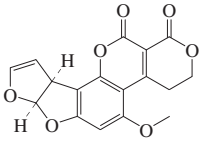
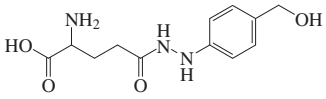

Affinin


Aflatoxin B1


Aflatoxin B2


Aflatoxin G1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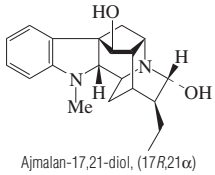
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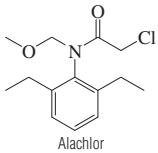
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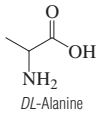
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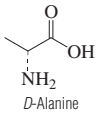
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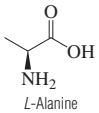
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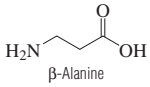
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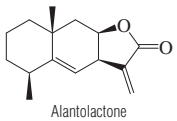
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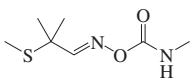
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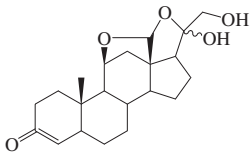
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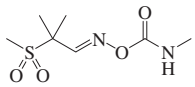
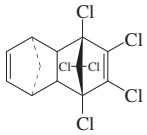

Aldoxycarb *S*,*S*-dioxide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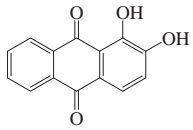
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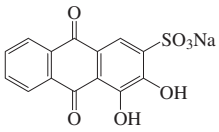
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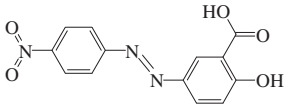
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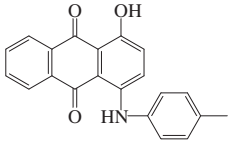
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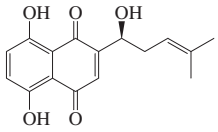
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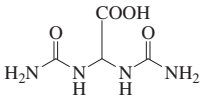
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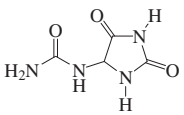
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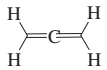
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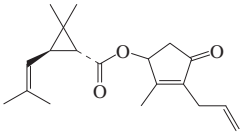
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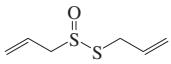
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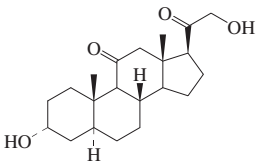
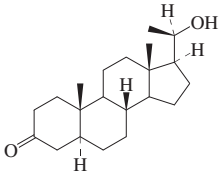

Allopregnane-3β,21-diol-11,20-dione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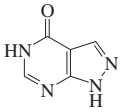
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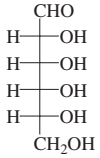
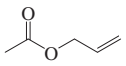

D-Allose

Alloxanic acid

Alloxantin

No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
167	Allyl acetate		$C_5H_8O_2$	591-87-7	100.117			103.5	0.9275^{20}	1.4049^{20}	sl H_2O; s ace; msc EtOH, eth
168	Allyl acetoacetate		$C_7H_{10}O_3$	1118-84-9	142.152	liq	-85	196; 66.5^{14}	1.0366^{20}	1.4398^{20}	s H_2O, lig; msc EtOH, bz
169	Allyl acrylate		$C_6H_8O_2$	999-55-3	112.127			121	0.9441^{20}	1.4320^{20}	sl H_2O; s EtOH, eth, acid
170	Allyl alcohol	2-Propen-1-ol	C_3H_6O	107-18-6	58.079	liq	-129	97.0	0.8540^{20}	1.4135^{20}	msc H_2O, EtOH, eth; s chl
171	Allylamine	2-Propen-1-amine	C_3H_7N	107-11-9	57.095	liq	-88.2	53.3	0.758^{20}	1.4205^{20}	msc H_2O, EtOH, eth; s chl
172	*N*-Allylaniline	Allylphenylamine	$C_9H_{11}N$	589-09-3	133.190			219; 106^{12}	0.9736^{25}	1.563^{20}	sl H_2O; s EtOH, ace; msc eth
173	Allylbenzene	2-Propenylbenzene	C_9H_{10}	300-57-2	118.175	liq	-40	156	0.8920^{20}	1.5131^{20}	i H_2O; s EtOH, eth, bz, ctc
174	α-Allylbenzenemethanol		$C_{10}H_{12}O$	936-58-3	148.201			228.5	1.004^{18}	1.5289^{21}	
175	Allyl benzoate		$C_{10}H_{10}O_2$	583-04-0	162.185				1.0569^{15}	1.5178^{20}	i H_2O; s EtOH, eth, ace, MeOH
176	Allyl butanoate		$C_7H_{12}O_2$	2051-78-7	128.169			142; 44.5^{15}	0.9017^{20}	1.4158^{20}	i H_2O; msc EtOH, eth; sl ctc
177	Allyl carbamate		$C_4H_7NO_2$	2114-11-6	101.105						sl ctc
178	Allylchlorodimethylsilane		$C_5H_{11}ClSi$	4028-23-3	134.680			111	0.8964^{20}	1.4195^{20}	
179	Allyl chloroformate		$C_4H_5ClO_2$	2937-50-0	120.535	hyg liq		109.5	1.136	1.4220^{20}	
180	Allyl *trans*-cinnamate	Allyl *trans*-3-phenyl-2-propenoate	$C_{12}H_{12}O_2$	1866-31-5	188.222			dec 268; 163^{17}	1.048^{23}	1.530^{20}	i H_2O; vs EtOH; msc eth; sl ctc
181	1-Allylcyclohexanol		$C_9H_{16}O$	1123-34-8	140.222			190	0.9341^{22}	1.4756^{22}	
182	1-Allylcyclohexene	1-(2-Propenyl)cyclohexene	C_9H_{14}	13511-13-2	122.207	liq		156			
183	Allylcyclopentane		C_8H_{14}	3524-75-2	110.197	liq	-110.7	125	0.793^{25}	1.4412^{20}	s chl
184	Allyldiethoxymethylsilane		$C_8H_{18}O_2Si$	18388-45-9	174.314			155	0.8572^{25}	1.4104^{20}	
185	Allyldiethylamine	*N,N*-Diethyl-2-propen-1-amine	$C_7H_{15}N$	5666-17-1	113.201			110	0.7477^{25}	1.4209^{20}	
186	Allyldimethylamine	*N,N*-Dimethyl-2-propen-1-amine	$C_5H_{11}N$	2155-94-4	85.148			63.5	0.7094^{25}	1.4010^{20}	
187	Allyl ethyl ether		$C_5H_{10}O$	557-31-3	86.132			67.6	0.7651^{20}	1.3881^{20}	i H_2O; msc EtOH, eth; s ace
188	Allyl formate		$C_4H_6O_2$	1838-59-1	86.090			83.6	0.9460^{20}		sl H_2O; s EtOH; msc eth
189	Allyl 2-furancarboxylate	Allyl 2-furanoate	$C_8H_8O_3$	4208-49-5	152.148			207.5	1.115^{25}	1.4945^{20}	s eth, ace; sl ctc
190	Allyl glycidyl ether		$C_6H_{10}O_2$	106-92-3	114.142			154	0.9698^{20}	1.4332^{20}	
191	Allyl hexanoate		$C_9H_{16}O_2$	123-68-2	156.222			186	0.8869^{20}		
192	Allyl (hydroxymethyl)carbamate		$C_5H_9NO_3$	24935-97-5	131.130	cry (tol)	57				
193	Allyl isocyanate		C_4H_5NO	1476-23-9	83.089			88			
194	Allyl isothiocyanate		C_4H_5NS	57-06-7	99.155	liq	-80	152	1.0126^{20}	1.5306^{20}	vs bz, eth, EtOH
195	Allyl methacrylate		$C_7H_{10}O_2$	96-05-9	126.153			67^{50}, 55^{30}	0.9335^{20}	1.4360^{20}	
196	4-Allyl-2-methoxyphenol	Eugenol	$C_{10}H_{12}O_2$	97-53-0	164.201	liq	-7.5	253.2	1.0652^{20}	1.5405^{20}	i H_2O; msc EtOH, eth; s chl, HOAc, oils
197	4-Allyl-2-methoxyphenyl acetate	1,3,4-Eugenol acetate	$C_{12}H_{14}O_3$	93-28-7	206.237	pr (al)	30.5	281; 127^{6}	1.0806^{20}	1.5205^{20}	i H_2O; s EtOH; sl ctc
198	Allyl 3-methylbutanoate		$C_8H_{14}O_2$	2835-39-4	142.196			154			
199	Allylmethyldichlorosilane		$C_4H_8Cl_2Si$	1873-92-3	155.099			119.5	1.0758^{20}	1.4419^{20}	
200	2-(Allyloxy)ethanol	Ethylene glycol monoallyl ether	$C_5H_{10}O_2$	111-45-5	102.132			158.5	0.9580^{20}	1.4358^{20}	msc H_2O; vs EtOH; s bz, ctc, MeOH
201	2-Allylphenol		$C_9H_{10}O$	1745-81-9	134.174	liq	-6	220	1.0246^{15}	1.5181^{20}	vs eth
202	4-Allylphenol	Chavicol	$C_9H_{10}O$	501-92-8	134.174		15.8	238	1.0203^{15}	1.5441^{18}	vs eth, EtOH, chl
203	Allyl phenyl ether		$C_9H_{10}O$	1746-13-0	134.174			191.7	0.9811^{20}	1.5223^{20}	i H_2O; s EtOH; msc eth; sl ctc
204	Allyl propanoate	2-Propenyl propanoate	$C_6H_{10}O_2$	2408-20-0	114.142			123	0.9140^{20}	1.4105^{20}	s EtOH, eth, ace
205	*N*-Allyl-2-propen-1-amine	Diallylamine	$C_6H_{11}N$	124-02-7	97.158			111		1.4387^{20}	s EtOH, eth
206	Allyl propyl disulfide		$C_6H_{12}S_2$	2179-59-1	148.289			79^{13}		1.5219^{20}	
207	3-(Allylsulfinyl)-*L*-alanine, (*S*)	Alliin	$C_6H_{11}NO_3S$	556-27-4	177.221	nd (dil ac)	165				vs H_2O
208	Allylthiourea	Thiosinamine	$C_4H_8N_2S$	109-57-9	116.185	mcl or orth pr (w)	78		1.217^{20}	1.5936^{78}	s H_2O, EtOH; sl eth; i bz
209	Allyltrichlorosilane	Trichloro-2-propenylsilane	$C_3H_5Cl_3Si$	107-37-9	175.517		35	117.5	1.2011^{20}	1.4460^{20}	
210	Allyltriethoxysilane		$C_9H_{20}O_3Si$	2550-04-1	204.339			100^{50}, 82^{28}	0.9030^{20}	1.4072^{20}	
211	Allyltrimethylsilane		$C_6H_{14}Si$	762-72-1	114.261			85	0.7158^{25}	1.4074^{20}	i H_2O
212	Allylurea		$C_4H_8N_2O$	557-11-9	100.119	nd (al)	85				msc H_2O, EtOH; sl eth, chl; i peth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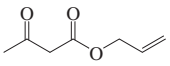
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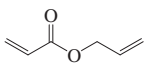
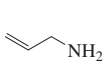

Allyl acrylate


Allyl alcohol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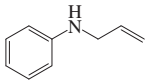
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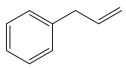
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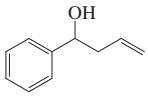
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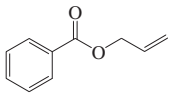
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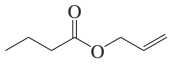
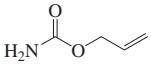
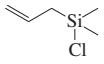

Allyl butanoate


Allyl carbamate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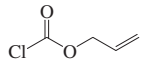
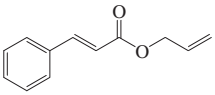
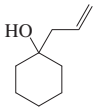
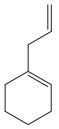

Allyl chloroformate


Allyl *trans*-cinnamate


1-Allylcyclohexanol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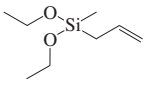
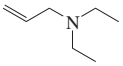
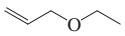
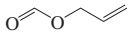
Allylcyclopentane

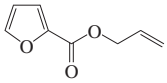

Allyldiethoxymethylsilane

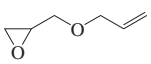

Allyldiethylamine

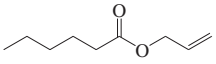

Allyldimethylamine

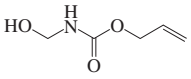

Allyl ethyl ether

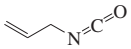

Allyl formate

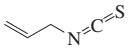

Allyl 2-furancarboxylate

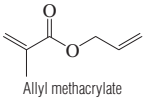

Allyl glycidyl ether

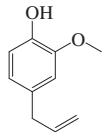

Allyl hexanoate

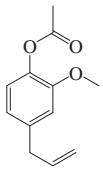

Allyl (hydroxymethyl)carbamate

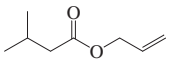

Allyl isocyanate

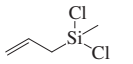

Allyl isothiocyanate

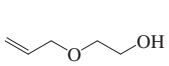

Allyl methacrylate

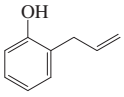

4-Allyl-2-methoxyphenol

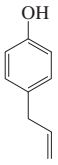

4-Allyl-2-methoxyphenyl acetate

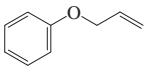

Allyl 3-methylbutanoate

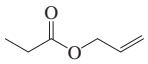

Allylmethyldichlorosilane

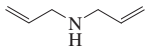

2-(Allyloxy)ethanol

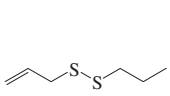

2-Allylphenol


4-Allylphenol


Allyl phenyl ether


Allyl propanoate


N-Allyl-2-propen-1-amine


Allyl propyl disulfide

3-(Allylsulfinyl)-*L*-alanine, (*S*)

Allylthiourea

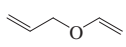
Allyltrichlorosilane

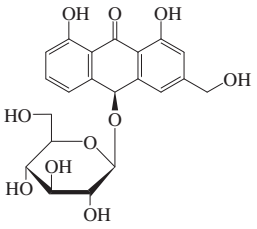
Allyltriethoxysilane

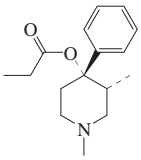
Allyltrimethylsilane

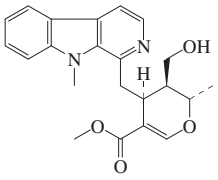
Allylurea

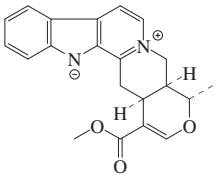
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
213	Allyl vinyl ether	3-(Ethenyloxy)-1-propene	C_5H_8O	3917-15-5	84.117			66	0.7900^{20}	1.4062^{20}	i H_2O; s eth, ace, chl
214	Aloin A		$C_{21}H_{22}O_9$	1415-73-2	418.395		149.3				s H_2O, EtOH, ace; sl eth, bz; i chl
215	Alphaprodine		$C_{16}H_{23}NO_2$	15867-21-7	261.360	cry	103				
216	Alstonidine		$C_{22}H_{24}N_2O_4$	25394-75-6	380.437	cry (eth)	189				vs ace, EtOH
217	Alstonine		$C_{21}H_{20}N_2O_3$	642-18-2	348.395	ye nd (ace)	207 dec				
218	*D*-Altrose		$C_6H_{12}O_6$	1990-29-0	180.155	pr (MeOH,al)	103.5				vs H_2O
219	Aluminum 2-butoxide	2-Butanol, aluminum salt	$C_{12}H_{27}AlO_3$	2269-22-9	246.322			197^{20}			
220	Aluminum distearate	Hydroxyaluminum distearate	$C_{36}H_{71}AlO_5$	300-92-5	610.928	wh pow	145				i H_2O
221	Aluminum ethanolate	Aluminum ethoxide	$C_6H_{15}AlO_3$	555-75-9	162.163	liq/wh solid	140	200^{7}			dec H_2O; sl xyl
222	Aluminum isopropoxide		$C_9H_{21}AlO_3$	555-31-7	204.243	hyg wh solid	119	135^{10}, $94^{0.5}$			reac H_2O; s EtOH, bz, peth, chl
223	Alverine	*N*-Ethyl-bis(3-phenylpropyl) amine	$C_{20}H_{27}N$	150-59-4	281.435	oil		$166^{0.3}$			
224	α-Amanitin		$C_{39}H_{54}N_{10}O_{14}S$	23109-05-9	918.970	nd	254 dec				
225	Amaranth dye		$C_{20}H_{11}N_2Na_3O_{10}S_3$	915-67-3	604.472	dk red pow					s H_2O
226	Ametryn		$C_9H_{17}N_5S$	834-12-8	227.330		88				
227	Amminetrimethylboron		$C_3H_{12}BN$	1830-95-1	72.945		73.5				
228	19-Amino-8,11,13-abietatriene		$C_{20}H_{31}N$	1446-61-3	285.467	cry	44.5				
229	2-Aminoacetamide		$C_2H_6N_2O$	598-41-4	74.081	hyg nd (chl)	67.5				vs H_2O, EtOH; sl eth, bz; s ace, chl
230	Aminoacetonitrile		$C_2H_4N_2$	540-61-4	56.066			58^{15}			vs EtOH
231	Aminoacetonitrile monohydrochloride		$C_2H_5ClN_2$	6011-14-9	92.527	hyg cry (al)	165 dec				
232	α-Aminoacetophenone hydrochloride		$C_8H_{10}ClNO$	5468-37-1	171.624		194 dec				
233	1-Aminoadamantane hydrochloride	Adamantanamine hydrochloride	$C_{10}H_{18}ClN$	665-66-7	187.710	cry (al-eth)	360 dec				vs H_2O, EtOH
234	2-Aminoadipic acid		$C_6H_{11}NO_4$	626-71-1	161.156	pl (w)	207.0				sl H_2O, EtOH, eth
235	3-Aminoalanine	2,3-Diaminopropionic acid	$C_3H_8N_2O_2$	515-94-6	104.108	hyg rosettes	110				vs H_2O
236	1-Amino-9,10-anthracenedione	1-Aminoanthraquinone	$C_{14}H_9NO_2$	82-45-1	223.227	red nd (al)	253.5	sub			vs ace, bz, EtOH, chl
237	2-Amino-9,10-anthracenedione	2-Aminoanthraquinone	$C_{14}H_9NO_2$	117-79-3	223.227	red nd (al, HOAc)	304.5	sub			i H_2O, eth; sl EtOH; s ace, bz, chl
238	4-Aminoazobenzene		$C_{12}H_{11}N_3$	60-09-3	197.235	oran mcl nd (al)	127	>360			sl H_2O, lig; s EtOH, eth, bz, chl
239	2-Aminobenzaldehyde		C_7H_7NO	529-23-7	121.137	silv lf	40.5	80^{2}			sl H_2O; vs EtOH, eth; s bz, chl; i lig
240	3-Aminobenzaldehyde		C_7H_7NO	1709-44-0	121.137	nd (AcOEt)	29				s eth, acid
241	4-Aminobenzaldehyde		C_7H_7NO	556-18-3	121.137	pl (w)	71.5				s H_2O, EtOH, eth, acid
242	2-Aminobenzamide		$C_7H_8N_2O$	88-68-6	136.151		110.5 dec				s H_2O, EtOH; sl eth, bz; vs AcOEt
243	4-Aminobenzamide		$C_7H_8N_2O$	2835-68-9	136.151	ye cry (+1/ 4w)	183				sl H_2O; s EtOH, eth
244	α-Aminobenzeneacetic acid, (±)	α-Phenylglycine	$C_8H_9NO_2$	2835-06-5	151.163	pl	292 dec	sub 255			s alk; sl os
245	4-Aminobenzeneacetic acid	*p*-Aminophenylacetic acid	$C_8H_9NO_2$	1197-55-3	151.163	pl (w)	200 dec				i H_2O; sl EtOH, DMSO
246	5-Amino-1,3-benzenedicarboxylic acid		$C_8H_7NO_4$	99-31-0	181.147	pr(al), pl(w)	360	sub			i H_2O; sl EtOH
247	4-Aminobenzeneethanol		$C_8H_{11}NO$	104-10-9	137.179	nd (al)	108				
248	2-Aminobenzenemethanamine		$C_7H_{10}N_2$	4403-69-4	122.167		61	269			vs EtOH
249	2-Aminobenzenemethanol		C_7H_9NO	5344-90-1	123.152		83.5	273			s H_2O, EtOH, eth, HOAc; vs bz, chl
250	4-Aminobenzenesulfonamide	Sulfanilamide	$C_6H_8N_2O_2S$	63-74-1	172.205	lf (dil al)	165.5		1.08^{25}		s H_2O, EtOH, eth, ace; sl chl, peth
251	2-Aminobenzenesulfonic acid	Orthanilic acid	$C_6H_7NO_3S$	88-21-1	173.190	pr (+ 1/2w)	>320 dec				sl H_2O; i EtOH, eth
252	3-Aminobenzenesulfonic acid	Metanilic acid	$C_6H_7NO_3S$	121-47-1	173.190	nd, pr (w +1)	dec				sl H_2O, EtOH; i eth
253	4-Aminobenzenesulfonic acid	Sulfanilic acid	$C_6H_7NO_3S$	121-57-3	173.190	orth pl or mcl (w+2)	288		1.485^{25}		sl H_2O; i EtOH, eth
254	4-Aminobenzenesulfonyl fluoride	*p*-Sulfanilyl fluoride	$C_6H_6FNO_2S$	98-62-4	175.181		68.5				

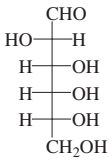

Allyl vinyl ether

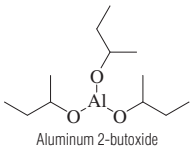

Aloin A

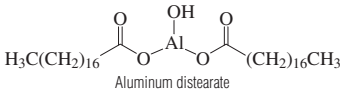

Alphaprodine

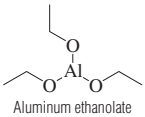

Alstonidine

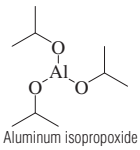

Alstonine

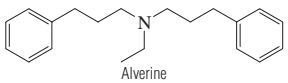

D-Altrose

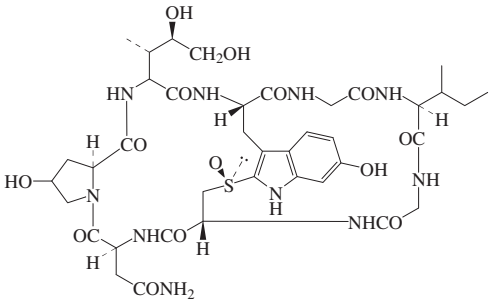

Aluminum 2-butoxide

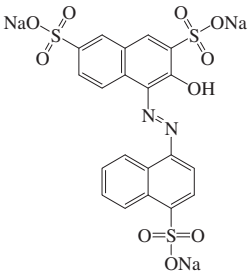

Aluminum distearate

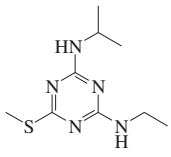

Aluminum ethanolate

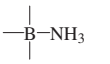

Aluminum isopropoxide

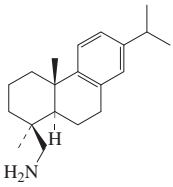

Alverine

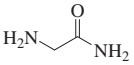

α-Amanitin

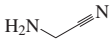

Amaranth dye


Ametryn

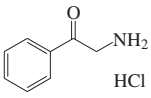

Amminetrimethylboron

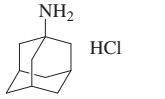

19-Amino-8,11,13-abietatriene

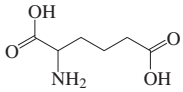

2-Aminoacetamide

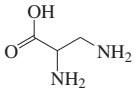

Aminoacetonitrile

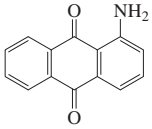

Aminoacetonitrile monohydrochloride

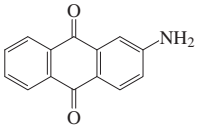

α-Aminoacetophenone hydrochloride


1-Aminoadamantane hydrochloride


2-Aminoadipic acid


3-Aminoalanine


1-Amino-9,10-anthracenedione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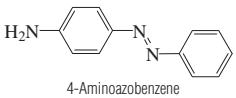
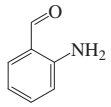
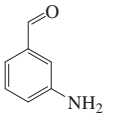

4-Aminoazobenzene


2-Aminobenzaldehyde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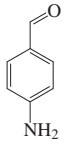
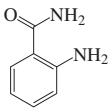
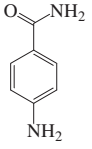
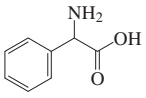
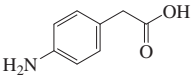
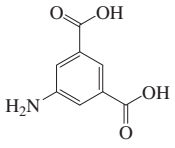

4-Aminobenzaldehyde

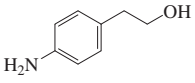

2-Aminobenzamide

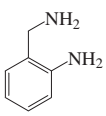

4-Aminobenzamide

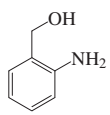

α-Aminobenzeneacetic acid, (±)

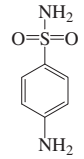

4-Aminobenzeneacetic acid

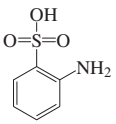

5-Amino-1,3-benzenedicarboxylic acid

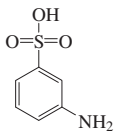

4-Aminobenzeneethanol


2-Aminobenzenemethanamine


2-Aminobenzenemethanol


4-Aminobenzenesulfonamide

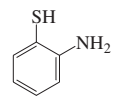

2-Aminobenzenesulfonic acid

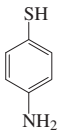

3-Aminobenzenesulfonic acid

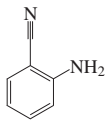
4-Aminobenzenesulfonic acid

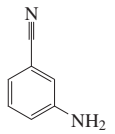
4-Aminobenzenesulfonyl fluoride

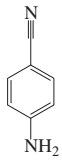
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
255	2-Aminobenzenethiol		C_6H_7NS	137-07-5	125.192		26	234		1.4606^{20}	s EtOH, eth
256	4-Aminobenzenethiol		C_6H_7NS	1193-02-8	125.192		46	143^{17}			s H_2O, EtOH
257	2-Aminobenzonitrile		$C_7H_6N_2$	1885-29-6	118.136	ye pr (CS_2) nd (peth)	51	263			sl H_2O; vs EtOH, eth, ace, bz; i peth
258	3-Aminobenzonitrile		$C_7H_6N_2$	2237-30-1	118.136	nd (dil al or CCl_4)	54.3	289			sl H_2O; vs EtOH, eth, ace, chl
259	4-Aminobenzonitrile		$C_7H_6N_2$	873-74-5	118.136	pr or pl (w)	87.0				sl H_2O, ctc; vs EtOH, eth, ace, bz
260	4-Aminobenzophenone		$C_{13}H_{11}NO$	1137-41-3	197.232	lf (dil al)	124	246^{13}			sl H_2O, tfa; s EtOH, eth, HOAc
261	*N*-(4-Aminobenzoyl)-*L*-glutamic acid		$C_{12}H_{14}N_2O_5$	4271-30-1	266.249	cry (w)	173				
262	*N*-(4-Aminobenzoyl)glycine	*p*-Aminohippuric acid	$C_9H_{10}N_2O_3$	61-78-9	194.186	pr or nd (w)	198.5				vs ace, bz, EtOH
263	2-Aminobiphenyl		$C_{12}H_{11}N$	90-41-5	169.222	lf (dil al)	51	299			i H_2O; s EtOH, eth, bz; sl DMSO, peth
264	3-Aminobiphenyl		$C_{12}H_{11}N$	2243-47-2	169.222	nd	31.5				sl H_2O; s EtOH, eth, ace, bz
265	4-Aminobiphenyl	*p*-Biphenylamine	$C_{12}H_{11}N$	92-67-1	169.222	lf (dil al)	53.5	302			sl H_2O; s EtOH, eth, ace, chl
266	2-Amino-5-bromobenzoic acid	5-Bromoanthranilic acid	$C_7H_6BrNO_2$	5794-88-7	216.033	nd	219.5				s DMSO
267	1-Amino-4-bromo-9,10-dihydro-9,10-dioxo-2-anthracenesulfonic acid	1-Amino-4-bromoanthraquinone-2-sulfonic acid	$C_{14}H_8BrNO_5S$	116-81-4	382.187	red nd (w)					
268	*DL*-2-Aminobutanoic acid		$C_4H_9NO_2$	2835-81-6	103.120	lf (w)	304 dec	sub	1.2300^{20}		vs H_2O; sl EtOH; i eth, bz
269	*L*-2-Aminobutanoic acid		$C_4H_9NO_2$	1492-24-6	103.120	lf (dil al), cry (al)	292 dec				s H_2O; sl EtOH, eth; i bz
270	*DL*-3-Aminobutanoic acid		$C_4H_9NO_2$	2835-82-7	103.120	nd (al)	194.3				vs H_2O; i EtOH, eth, bz
271	4-Aminobutanoic acid	γ-Aminobutyric acid	$C_4H_9NO_2$	56-12-2	103.120	pr or nd (al) lf (MeOH-eth)	203 dec				vs H_2O; sl EtOH, ace; i eth, bz
272	2-Amino-1-butanol, (±)		$C_4H_{11}NO$	13054-87-0	89.136	liq	-1.0	178	0.9162^{20}	1.4489^{25}	msc H_2O, EtOH, eth; sl chl
273	4-Amino-1-butanol		$C_4H_{11}NO$	13325-10-5	89.136			205; 125^{34}	0.967^{12}	1.4625^{20}	s H_2O, EtOH; i eth
274	4-Amino-*N*-[(butylamino) carbonyl]benzenesulfonamide	Carbutamide	$C_{11}H_{17}N_3O_3S$	339-43-5	271.336		144.5				
275	Aminocarb		$C_{11}H_{16}N_2O_2$	2032-59-9	208.257	cry	94				sl H_2O, bz; s ace
276	*N*-(Aminocarbonyl)acetamide		$C_3H_6N_2O_2$	591-07-1	102.092		218	sub 180			sl H_2O, eth; s EtOH
277	[4-[(Aminocarbonyl)amino] phenyl]arsonic acid	Carbarsone	$C_7H_9AsN_2O_4$	121-59-5	260.079	nd (w)	174				sl H_2O, DMSO, EtOH; i eth, chl; s alk
278	*N*-(Aminocarbonyl)-2-bromo-2-ethylbutanamide	Carbromal	$C_7H_{13}BrN_2O_2$	77-65-6	237.094	orth (dil al)	118		1.544^{25}		sl H_2O, chl; s ace, bz
279	*N*-(Aminocarbonyl)-2-bromo-3-methylbutanamide	Bromisovalum	$C_6H_{11}BrN_2O_2$	496-67-3	223.067	nd or lf (to)	154	sub	1.56^{15}		vs ace, bz, eth, EtOH
280	[2-(Aminocarbonyl)phenoxy]acetic acid	Salicylamide *O*-acetic acid	$C_9H_9NO_4$	25395-22-6	195.172		221				s alk
281	7-Aminocephalosporanic acid		$C_{10}H_{12}N_2O_5S$	957-68-6	272.277	cry					
282	1-Amino-5-chloro-9,10-anthracenedione	1-Amino-5-chloroanthraquinone	$C_{14}H_8ClNO_2$	117-11-3	257.673		212				
283	4-Amino-6-chloro-1,3-benzenedisulfonamide	Chloraminophenamide	$C_6H_8ClN_3O_4S_2$	121-30-2	285.729		254.5				
284	5-Amino-2-chlorobenzenesulfonic acid	6-Chlorometanilic acid	$C_6H_6ClNO_3S$	88-43-7	207.635	nd (w)	280 dec				
285	2-Amino-5-chlorobenzoic acid		$C_7H_6ClNO_2$	635-21-2	171.582		211				
286	5-Amino-2-chlorobenzoic acid		$C_7H_6ClNO_2$	89-54-3	171.582		188		1.519^{15}		vs EtOH
287	2-Amino-5-chlorobenzophenone	2-Benzoyl-4-chloroaniline	$C_{13}H_{10}ClNO$	719-59-5	231.677	ye nd	100.5				vs H_2O, EtOH, peth, chl
288	2-Amino-4-chloro-5-methylbenzenesulfonic acid	2-Chloro-*p*-toluidine-5-sulfonic acid	$C_7H_8ClNO_3S$	88-51-7	221.662	short nd (w)					
289	2-Amino-4-chlorophenol	2-Hydroxy-5-chloroaniline	C_6H_6ClNO	95-85-2	143.571		140				sl DMSO
290	1-Aminocyclopentanecarboxylic acid	Cycloleucine	$C_6H_{11}NO_2$	52-52-8	129.157	cry (al-w)	330 dec				
291	7-Aminodeacetoxycephalosporanic acid		$C_8H_{10}N_2O_3S$	22252-43-3	214.241		241 dec				
292	1-Amino-1-deoxy-*D*-glucitol	Glucamine	$C_6H_{15}NO_5$	488-43-7	181.187	cry (MeOH)	127				vs H_2O, EtOH
293	2-Amino-2-deoxy-*D*-glucose	*D*-Glucosamine	$C_6H_{13}NO_5$	3416-24-8	179.171						vs H_2O

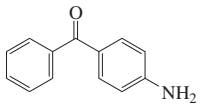

2-Aminobenzenethiol

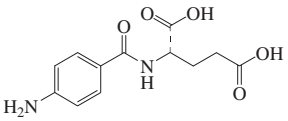

4-Aminobenzenethiol

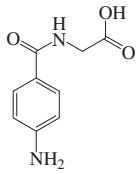

2-Aminobenzonitrile

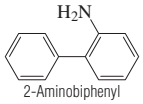

3-Aminobenzonitrile

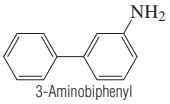

4-Aminobenzonitrile


4-Aminobenzophenone


N-(4-Aminobenzoyl)-*L*-glutamic acid


N-(4-Aminobenzoyl)glycine


2-Aminobiphenyl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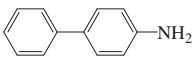
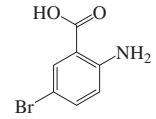
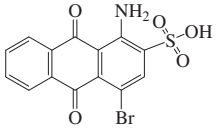
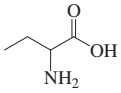
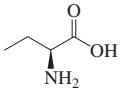
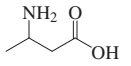

4-Aminobiphenyl

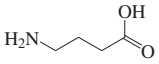

2-Amino-5-bromobenzoic acid

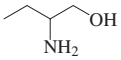

1-Amino-4-bromo-9,10-dihydro-9,10-dioxo-2-anthracenesulfonic acid

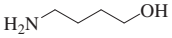

DL-2-Aminobutanoic acid

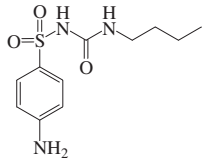

L-2-Aminobutanoic acid

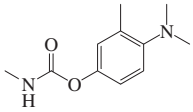

DL-3-Aminobutanoic acid

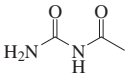

4-Aminobutanoic acid

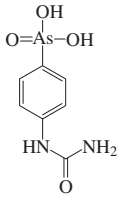

2-Amino-1-butanol, (±)

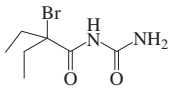

4-Amino-1-butanol

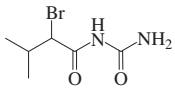

4-Amino-*N*-[(butylamino)carbonyl]benzenesulfonamide

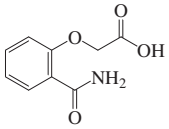

Aminocarb

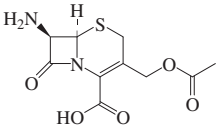

N-(Aminocarbonyl)acetamide

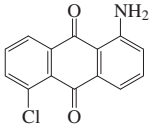

[4-[(Aminocarbonyl)amino]phenyl]arsonic acid

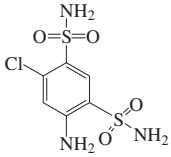

N-(Aminocarbonyl)-2-bromo-2-ethylbutanamide

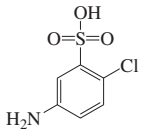

N-(Aminocarbonyl)-2-bromo-3-methylbutanamide

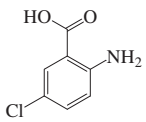

[2-(Aminocarbonyl)phenoxy]acetic acid

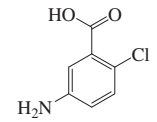

7-Aminocephalosporanic acid

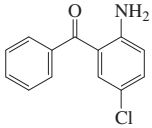

1-Amino-5-chloro-9,10-anthracenedione

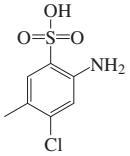

4-Amino-6-chloro-1,3-benzenedisulfonamide

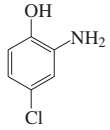

5-Amino-2-chlorobenzenesulfonic acid

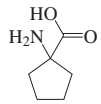

2-Amino-5-chlorobenzoic acid

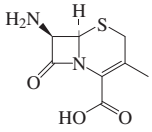

5-Amino-2-chlorobenzoic acid

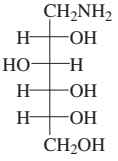

2-Amino-5-chlorobenzophenone

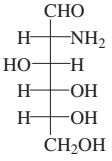

2-Amino-4-chloro-5-methylbenzenesulfonic acid


2-Amino-4-chlorophenol

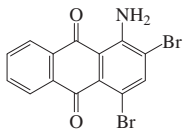

1-Aminocyclopentanecarboxylic acid

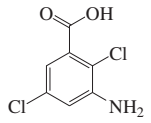

7-Aminodeacetoxycephalosporanic acid

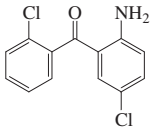

1-Amino-1-deoxy-*D*-glucitol

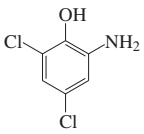

2-Amino-2-deoxy-*D*-glucose

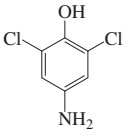
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
294	1-Amino-2,4-dibromo-9,10-anthracenedione		$C_{14}H_7Br_2NO_2$	81-49-2	381.020	red nd (xyl)	226				
295	3-Amino-2,5-dichlorobenzoic acid	Chloramben	$C_7H_5Cl_2NO_2$	133-90-4	206.027		200				sl DMSO
296	2-Amino-2',5-dichlorobenzophenone		$C_{13}H_9Cl_2NO$	2958-36-3	266.122		≈80				
297	2-Amino-4,6-dichlorophenol		$C_6H_5Cl_2NO$	527-62-8	178.016	long nd (CS_2)	95.5	sub 70			
298	4-Amino-2,6-dichlorophenol		$C_6H_5Cl_2NO$	5930-28-9	178.016	nd or lf (w, bz)	168	sub			i H_2O; vs EtOH, eth; s ace; sl bz, HOAc
299	2-Amino-1,7-dihydro-7-methyl-6*H*-purin-6-one	7-Methylguanine	$C_6H_7N_5O$	578-76-7	165.153		370				
300	5-Amino-2,3-dihydro-1,4-phthalazinedione	Luminol	$C_8H_7N_3O_2$	521-31-3	177.161	ye nd (al)	330.5				i H_2O; sl EtOH, eth; vs alk; s HOAc
301	2-Amino-1,7-dihydro-6*H*-purine-6-thione	Thioguanine	$C_5H_5N_5S$	154-42-7	167.193		>360				
302	6-Amino-1,3-dihydro-2*H*-purin-2-one	Isoguanine	$C_5H_5N_5O$	3373-53-3	151.127		>360				i H_2O
303	2-Amino-3,4-dimethylimidazo[4,5-f]quinoline	Me-IQ	$C_{12}H_{12}N_4$	77094-11-2	212.250	cry	297				
304	2-Amino-4,6-dinitrophenol	Picramic acid	$C_6H_5N_3O_5$	96-91-3	199.121	dk red nd (al) pr (chl)	169				vs bz, EtOH
305	2-Aminoethanesulfonic acid	Taurine	$C_2H_7NO_3S$	107-35-7	125.147	mcl pr (w)	328				vs H_2O
306	1-Aminoethanol	Acetaldehyde ammonia	C_2H_7NO	75-39-8	61.083	orth (eth-al)	97	dec 110			s H_2O; sl eth
307	2-(2-Aminoethoxy)ethanol	Diglycolamine	$C_4H_{11}NO_2$	929-06-6	105.136		-12.5	221	1.0572^{20}		
308	*N*-(2-Aminoethyl)acetamide		$C_4H_{10}N_2O$	1001-53-2	102.134		51				s H_2O, EtOH, bz; i eth
309	6-Amino-3-ethyl-1-allyl-2,4(1*H*,3*H*)-pyrimidinedione	Aminometradine	$C_9H_{13}N_3O_2$	642-44-4	195.218	cry (+1w, w)	143				
310	1-[(2-Aminoethyl)amino]-2-propanol	*N*-(2-Hydroxypropyl) ethylenediamine	$C_5H_{14}N_2O$	123-84-2	118.177			94^{3}	0.9837^{25}	1.4738^{20}	
311	4-(2-Aminoethyl)-1,2-benzenediol, hydrochloride	Dopamine hydrochloride	$C_8H_{12}ClNO_2$	62-31-7	189.640	nd (w)	241 dec				vs H_2O, MeOH
312	α-(1-Aminoethyl) benzenemethanol, [*S*-(*R**,*R**)]-		$C_9H_{13}NO$	492-39-7	151.205	pl(MeOH)	77.5				vs eth, EtOH, chl
313	α-(1-Aminoethyl) benzenemethanol, hydrochloride		$C_9H_{14}ClNO$	53631-70-2	187.666		198.5				s H_2O
314	*N*-(2-Aminoethyl)ethanolamine		$C_4H_{12}N_2O$	111-41-1	104.150			239; 105^{10}	1.0286^{20}	1.4863^{20}	msc H_2O, EtOH; s ace; sl bz, lig
315	4-(2-Aminoethyl)phenol	Tyramine	$C_8H_{11}NO$	51-67-2	137.179	pl or nd (bz, w), cry (al)	164.5	206^{25}			sl H_2O, bz, DMSO; s EtOH, xyl; i tol
316	*N*-(2-Aminoethyl)-1,3-propanediamine	*N*-(3-Aminopropyl) ethylenediamine	$C_5H_{15}N_3$	13531-52-7	117.193			87^{3}		1.4805^{25}	
317	2-Amino-2-ethyl-1,3-propanediol		$C_5H_{13}NO_2$	115-70-8	119.163		37.5	152^{10}	1.099^{20}	1.490^{20}	msc H_2O
318	*L*-2-Aminohexanedioic acid	2-Aminoadipic acid	$C_6H_{11}NO_4$	542-32-5	161.156	cry (EtOH, w)	205 dec				sl H_2O, EtOH, eth
319	6-Aminohexanenitrile	5-Cyano-1-pentylamine	$C_6H_{12}N_2$	2432-74-8	112.172	liq		118^{16}			
320	6-Aminohexanoic acid	ε-Aminocaproic acid	$C_6H_{13}NO_2$	60-32-2	131.173	lf (eth)	205				vs H_2O; i EtOH; sl MeOH
321	6-Amino-1-hexanol		$C_6H_{15}NO$	4048-33-3	117.189		57	137^{30}			
322	1-Amino-4-hydroxy-9,10-anthracenedione		$C_{14}H_9NO_3$	116-85-8	239.226		216.5				s EtOH, ace
323	3-Amino-4-hydroxybenzenesulfonic acid		$C_6H_7NO_4S$	98-37-3	189.190	orth (w+1)	>300				sl H_2O; i EtOH, eth
324	4-Amino-2-hydroxybenzohydrazide	*p*-Aminosalicylic acid hydrazide	$C_7H_9N_3O_2$	6946-29-8	167.165	nd (al)	195				vs EtOH
325	2-Amino-3-hydroxybenzoic acid		$C_7H_7NO_3$	548-93-6	153.136	lf (w)	253.5				sl H_2O; s EtOH, eth, chl
326	4-Amino-2-hydroxybenzoic acid	*p*-Aminosalicylic acid	$C_7H_7NO_3$	65-49-6	153.136	nd, pl (al-eth)	150 dec				s H_2O, EtOH, eth, ace; i bz, peth, chl
327	5-Amino-2-hydroxybenzoic acid	Mesalamine	$C_7H_7NO_3$	89-57-6	153.136		283				sl H_2O; i EtOH
328	3-Amino-4-hydroxybutanoic acid	γ-Hydroxy-β-aminobutyric acid	$C_4H_9NO_3$	589-44-6	119.119	pr	216				vs H_2O; sl EtOH, chl, eth, AcOEt
329	4-Amino-3-hydroxybutanoic acid, (±)		$C_4H_9NO_3$	924-49-2	119.119	pr (w), cry (dil al)	218				vs H_2O
330	4-(2-Amino-1-hydroxyethyl)-1,2-benzenediol, (±)		$C_8H_{11}NO_3$	138-65-8	169.178		189 dec				
331	1-Amino-4-hydroxy-2-methoxy-9,10-anthracenedione		$C_{15}H_{11}NO_4$	2379-90-0	269.253						sl chl
332	4-Amino-5-(hydroxymethyl)-2(1*H*)-pyrimidinone	5-Hydroxymethylcytosine	$C_5H_7N_3O_2$	1123-95-1	141.129		>300 dec				

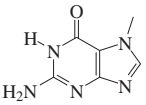

1-Amino-2,4-dibromo-9,10-anthracenedione

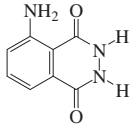

3-Amino-2,5-dichlorobenzoic acid

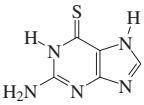

2-Amino-2',5-dichlorobenzophenone

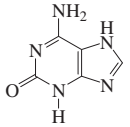

2-Amino-4,6-dichlorophenol

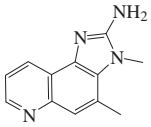

4-Amino-2,6-dichlorophenol

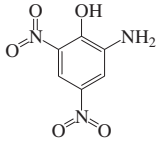

2-Amino-1,7-dihydro-7-methyl-6*H*-purin-6-one

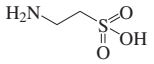

5-Amino-2,3-dihydro-1,4-phthalazinedione


2-Amino-1,7-dihydro-6*H*-purine-6-thione

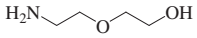

6-Amino-1,3-dihydro-2*H*-purin-2-one

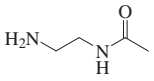

2-Amino-3,4-dimethylimidazo[4,5-f]quinoline

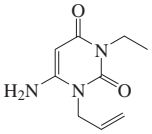

2-Amino-4,6-dinitrophenol

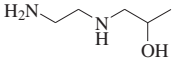

2-Aminoethanesulfonic acid

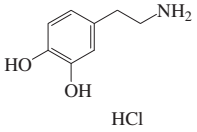

1-Aminoethanol

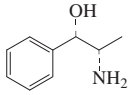

2-(2-Aminoethoxy)ethanol

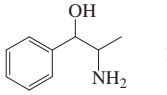

N-(2-Aminoethyl)acetamide

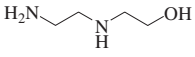

6-Amino-3-ethyl-1-allyl-2,4(1*H*,3*H*)-pyrimidinedione

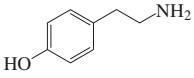

1-[(2-Aminoethyl)amino]-2-propanol

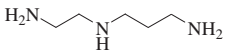

4-(2-Aminoethyl)-1,2-benzenediol, hydrochloride

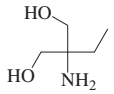

α-(1-Aminoethyl)benzenemethanol, [*S*-(*R**,*R**)]-

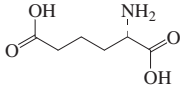

α-(1-Aminoethyl)benzenemethanol, hydrochloride

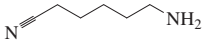

N-(2-Aminoethyl)ethanolamine

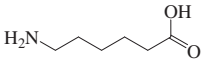

4-(2-Aminoethyl)phenol

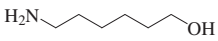

N-(2-Aminoethyl)-1,3-propanediamine

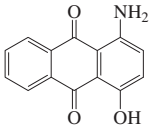

2-Amino-2-ethyl-1,3-propanediol

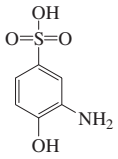

L-2-Aminohexanedioic acid

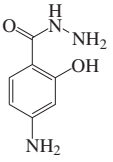

6-Aminohexanenitrile

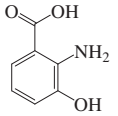

6-Aminohexanoic acid

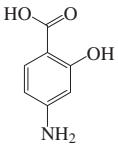

6-Amino-1-hexanol

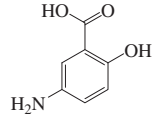

1-Amino-4-hydroxy-9,10-anthracenedione

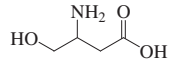

3-Amino-4-hydroxybenzenesulfonic acid

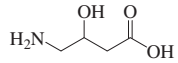

4-Amino-2-hydroxybenzohydrazide

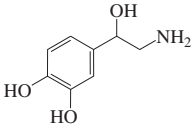

2-Amino-3-hydroxybenzoic acid

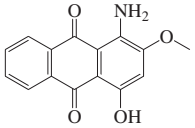

4-Amino-2-hydroxybenzoic acid

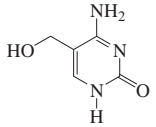

5-Amino-2-hydroxybenzoic acid


3-Amino-4-hydroxybutanoic acid

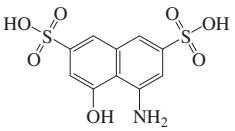

4-Amino-3-hydroxybutanoic acid, (±)

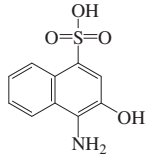

4-(2-Amino-1-hydroxyethyl)-1,2-benzenediol, (±)

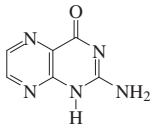

1-Amino-4-hydroxy-2-methoxy-9,10-anthracenedione

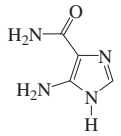

4-Amino-5-(hydroxymethyl)-2(1*H*)-pyrimidinone

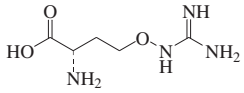
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
333	4-Amino-5-hydroxy-2,7-naphthalenedisulfonic acid	1-Naphthol-8-amino-3,6-disulfonic acid	$C_{10}H_9NO_7S_2$	90-20-0	319.311						sl H_2O, EtOH, eth
334	4-Amino-3-hydroxy-1-naphthalenesulfonic acid	1-Amino-2-naphthol-4-sulfonic acid	$C_{10}H_9NO_4S$	116-63-2	239.248	gray nd					i H_2O, EtOH, bz; s alk
335	2-Amino-4-hydroxypteridine		$C_6H_5N_5O$	2236-60-4	163.137	ye cry	>360				
336	5-Amino-1*H*-imidazole-4-carboxamide		$C_4H_6N_4O$	360-97-4	126.117	cry (EtOH)	170				
337	*O*-[(Aminoiminomethyl)amino]-*L*-homoserine	Canavanine	$C_5H_{12}N_4O_3$	543-38-4	176.174	cry (al)					vs H_2O
338	(Aminoiminomethyl)urea		$C_2H_6N_4O$	141-83-3	102.095	pr	105	dec 160			s H_2O, py; sl EtOH; i eth, bz, chl, CS_2
339	2-Amino-5-iodobenzoic acid		$C_7H_6INO_2$	5326-47-6	263.033		220 dec				sl H_2O, tfa; vs EtOH, eth, ace; s bz
340	4-Amino-1*H*-isoindole-1,3(2*H*)-dione		$C_8H_6N_2O_2$	2518-24-3	162.146		269.5				
341	4-Amino-3-isoxazolidinone, (*R*)	Cycloserine	$C_3H_6N_2O_2$	68-41-7	102.092		155 dec				s H_2O; sl MeOH
342	1-Amino-2-methyl-9,10-anthracenedione	1-Amino-2-methylanthraquinone	$C_{15}H_{11}NO_2$	82-28-0	237.254		205.5				i H_2O; s EtOH, bz, chl; sl eth
343	α-(Aminomethyl) benzenemethanol	Phenylethanolamine	$C_8H_{11}NO$	7568-93-6	137.179		56.5	160^{17}			vs H_2O; s EtOH
344	β-(Aminomethyl) benzenepropanoic acid	4-Amino-3-phenylbutyric acid	$C_{10}H_{13}NO_2$	1078-21-3	179.216		252 dec				
345	2-Amino-5-methylbenzenesulfonic acid		$C_7H_9NO_3S$	88-44-8	187.216	lt ye nd	132 dec				vs H_2O
346	*trans*-4-(Aminomethyl) cyclohexanecarboxylic acid	Tranexamic acid	$C_8H_{15}NO_2$	1197-18-8	157.211		>300				vs H_2O
347	4-Amino-4-methyl-2-pentanone	Diacetonamine	$C_6H_{13}NO$	625-04-7	115.173			$25^{0.14}$			s H_2O; msc EtOH, eth
348	2-Amino-4-methylphenol		C_7H_9NO	95-84-1	123.152	cry (w), orth (bz), lf or nd	136	sub			sl H_2O, bz; s EtOH, eth, chl; i lig
349	4-Amino-2-methylphenol		C_7H_9NO	2835-96-3	123.152	nd or lf (bz)	176.5	sub			sl H_2O, bz; s EtOH, eth
350	4-Amino-3-methylphenol		C_7H_9NO	2835-99-6	123.152	pr (dil al) cry (bz)	179				sl H_2O; vs EtOH, eth; s DMSO
351	(Aminomethyl)phosphonic acid		CH_6NO_3P	1066-51-9	111.038	cry	309				
352	2-Amino-2-methyl-1,3-propanediol		$C_4H_{11}NO_2$	115-69-5	105.136		110	151^{10}			vs H_2O; s EtOH
353	*L*-3-Amino-2-methylpropanoic acid		$C_4H_9NO_2$	144-90-1	103.120	cry (w)	182				
354	2-Amino-2-methyl-1-propanol	2-Aminoisobutanol	$C_4H_{11}NO$	124-68-5	89.136		25.5	165.5	0.934^{20}	1.449^{20}	msc H_2O; s ctc
355	4-Amino-5-methyl-2(1*H*)-pyrimidinone	5-Methylcytosine	$C_5H_7N_3O$	554-01-8	125.129	pr (w+1/2)	270 dec				s H_2O, acid; sl EtOH; i eth
356	3-(Aminomethyl)-3,5,5-trimethylcyclohexanol	1-Hydroxy-3-aminomethyl-3,5,5-trimethylcyclohexane	$C_{10}H_{21}NO$	15647-11-7	171.280		45.5	265	0.969^{25}	1.4904^{20}	
357	3-Amino-2-naphthalenecarboxylic acid	3-Amino-2-naphthoic acid	$C_{11}H_9NO_2$	5959-52-4	187.195	ye lf (dil al)	216.5				s EtOH, eth
358	2-Amino-1,4-naphthalenedione		$C_{10}H_7NO_2$	2348-81-4	173.169		207				i H_2O, alk; s EtOH, eth, HOAc
359	7-Amino-1,3-naphthalenedisulfonic acid	Amido-G-Acid	$C_{10}H_9NO_6S_2$	86-65-7	303.311	mcl pr or nd (w+4)	274				vs H_2O, EtOH
360	2-Amino-1,5-naphthalenedisulfonic acid	2-Naphthylamine-1,5-disulfonic acid	$C_{10}H_9NO_6S_2$	117-62-4	303.311		>300				
361	4-Amino-1,6-naphthalenedisulfonic acid	1-Naphthylamine-4,7-disulfonic acid	$C_{10}H_9NO_6S_2$	85-75-6	303.311						vs H_2O
362	4-Amino-1,7-naphthalenedisulfonic acid	1-Naphthylamine-4,6-disulfonic acid	$C_{10}H_9NO_6S_2$	85-74-5	303.311						vs H_2O, EtOH
363	2-Amino-1-naphthalenesulfonic acid	2-Naphthylamine-1-sulfonic acid	$C_{10}H_9NO_3S$	81-16-3	223.248	sc(hot w)					s DMSO
364	4-Amino-1-naphthalenesulfonic acid	1-Naphthylamine-4-sulfonic acid	$C_{10}H_9NO_3S$	84-86-6	223.248	wh nd (w+1/2) red-br cry	dec		1.6703^{25}		i H_2O; sl EtOH; s MeOH, py
365	5-Amino-1-naphthalenesulfonic acid	1-Naphthylamine-5-sulfonic acid	$C_{10}H_9NO_3S$	84-89-9	223.248	wh cry					s H_2O; i eth
366	6-Amino-1-naphthalenesulfonic acid	2-Naphthylamine-5-sulfonic acid	$C_{10}H_9NO_3S$	81-05-0	223.248	nd(w)					i H_2O, EtOH, eth
367	7-Amino-1-naphthalenesulfonic acid	Badische acid	$C_{10}H_9NO_3S$	86-60-2	223.248	nd (w+1), pl (aq ace)					vs HOAc
368	8-Amino-1-naphthalenesulfonic acid	1-Naphthylamine-8-sulfonic acid	$C_{10}H_9NO_3S$	82-75-7	223.248	nd					vs gl HOAc
369	6-Amino-2-naphthalenesulfonic acid	Bronner acid	$C_{10}H_9NO_3S$	93-00-5	223.248	lf					i cold H_2O; sl hot H_2O

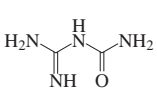

4-Amino-5-hydroxy-2,7-naphthalenedisulfonic acid

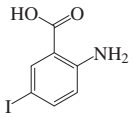

4-Amino-3-hydroxy-1-naphthalenesulfonic acid

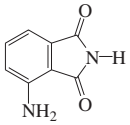

2-Amino-4-hydroxypteridine

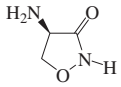

5-Amino-1*H*-imidazole-4-carboxamide

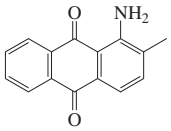

O-[(Aminoiminomethyl)amino]-*L*-homoserine

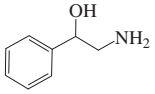

(Aminoiminomethyl)urea

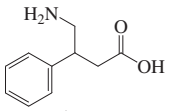

2-Amino-5-iodobenzoic acid

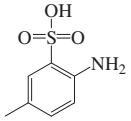

4-Amino-1*H*-isoindole-1,3(2*H*)-dione

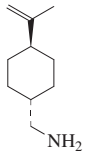

4-Amino-3-isoxazolidinone, (*R*)

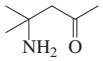

1-Amino-2-methyl-9,10-anthracenedione

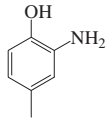

α-(Aminomethyl)benzenemethanol

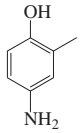

β-(Aminomethyl)benzenepropanoic acid

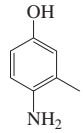

2-Amino-5-methylbenzenesulfonic acid

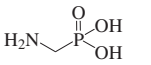

trans-4-(Aminomethyl)cyclohexanecarboxylic acid

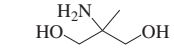

4-Amino-4-methyl-2-pentanone

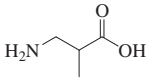

2-Amino-4-methylphenol

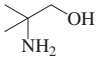

4-Amino-2-methylphenol

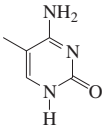

4-Amino-3-methylphenol

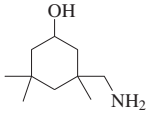

(Aminomethyl)phosphonic acid

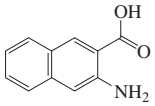

2-Amino-2-methyl-1,3-propanediol

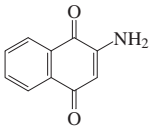

L-3-Amino-2-methylpropanoic acid

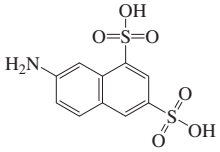

2-Amino-2-methyl-1-propanol

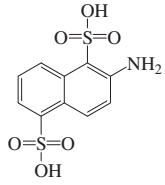

4-Amino-5-methyl-2(1*H*)-pyrimidinone

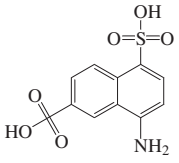

3-(Aminomethyl)-3,5,5-trimethylcyclohexanol

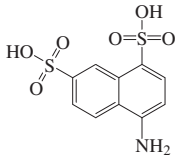

3-Amino-2-naphthalenecarboxylic acid

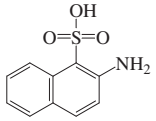

2-Amino-1,4-naphthalenedione

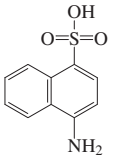

7-Amino-1,3-naphthalenedisulfonic acid

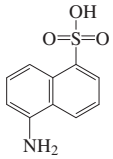

2-Amino-1,5-naphthalenedisulfonic acid

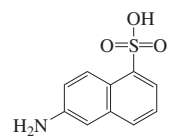

4-Amino-1,6-naphthalenedisulfonic acid

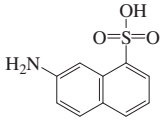

4-Amino-1,7-naphthalenedisulfonic acid

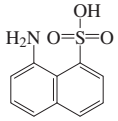

2-Amino-1-naphthalenesulfonic acid

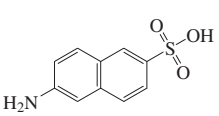

4-Amino-1-naphthalenesulfonic acid


5-Amino-1-naphthalenesulfonic acid

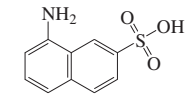

6-Amino-1-naphthalenesulfonic acid

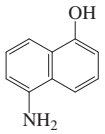

7-Amino-1-naphthalenesulfonic acid

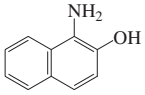

8-Amino-1-naphthalenesulfonic acid

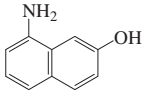

6-Amino-2-naphthalenesulfonic acid

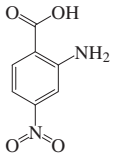
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
370	8-Amino-2-naphthalenesulfonic acid	1,7-Cleve's acid	$C_{10}H_9NO_3S$	119-28-8	223.248	nd or pr (w)					sl EtOH; s eth
371	5-Amino-1-naphthol	1-Amino-6-hydroxynaphthalene	$C_{10}H_9NO$	83-55-6	159.184		170				sl DMSO
372	1-Amino-2-naphthol		$C_{10}H_9NO$	2834-92-6	159.184	silvery lf (bz, eth)	150 dec				sl H_2O, eth; s EtOH; vs dil alk, acid
373	8-Amino-2-naphthol	8-Amino-β-naphthol	$C_{10}H_9NO$	118-46-7	159.184	nd (w, al)	206	sub			s H_2O, eth; vs EtOH; sl bz, lig
374	2-Amino-4-nitrobenzoic acid		$C_7H_6N_2O_4$	619-17-0	182.134	oran pr (dil al)	269				i H_2O; vs EtOH, eth, ace; s xyl
375	2-Amino-5-nitrobenzoic acid		$C_7H_6N_2O_4$	616-79-5	182.134	lf (al), ye nd (w, dil al)	269				i H_2O, bz, chl, xyl; s EtOH, eth
376	2-Amino-5-nitrobenzonitrile		$C_7H_5N_3O_2$	17420-30-3	163.134		203.5				sl DMSO
377	3-Amino-1-nitroguanidine		$CH_5N_5O_2$	18264-75-0	119.084		187.8				sl H_2O
378	2-Amino-4-nitrophenol		$C_6H_6N_2O_3$	99-57-0	154.123	oran pr (+w)	146				sl H_2O, ace; vs EtOH; s eth, bz, HOAc
379	2-Amino-5-nitrophenol		$C_6H_6N_2O_3$	121-88-0	154.123		205.8				s H_2O, EtOH, bz
380	4-Amino-2-nitrophenol		$C_6H_6N_2O_3$	119-34-6	154.123	dk red pl or nd (w, al)	131	110^{12}			s H_2O, EtOH, eth; sl DMSO
381	2-Aminooctanoic acid, (±)		$C_8H_{17}NO_2$	644-90-6	159.227	lf (w)	270	sub			sl H_2O, EtOH, eth, bz; s HOAc
382	Aminooxoacetohydrazide	Semioxamazide	$C_2H_5N_3O_2$	515-96-8	103.080		221 dec				sl H_2O; i EtOH, eth; vs alk, acid
383	*cis*-4-Amino-4-oxo-2-butenoic acid	Maleamic acid	$C_4H_5NO_3$	557-24-4	115.088	cry (al)	172.5				vs H_2O, EtOH
384	5-Amino-4-oxopentanoic acid	5-Aminolevulinic acid	$C_5H_9NO_3$	106-60-5	131.130	cry (EtOH)	118				
385	(Aminooxy)acetic acid, hydrochloride (2:1)		$C_4H_{11}ClN_2O_6$	2921-14-4	218.592		152.5				
386	6-Aminopenicillanic acid	Penicin	$C_8H_{12}N_2O_3S$	551-16-6	216.257	cry (w)	208				
387	5-Aminopentanoic acid		$C_5H_{11}NO_2$	660-88-8	117.147	lf (dil al)	157 dec	dec			s H_2O; sl EtOH; i eth, bz, lig
388	5-Amino-1-pentanol		$C_5H_{13}NO$	2508-29-4	103.163		38.5	221.5	0.9488^{17}	1.4618^{17}	msc H_2O, EtOH, ace
389	2-Aminophenol		C_6H_7NO	95-55-6	109.126	wh orth bipym nd (bz)	174	sub 153	1.328^{25}		s H_2O, eth; vs EtOH; sl bz, tfa
390	3-Aminophenol		C_6H_7NO	591-27-5	109.126	pr (to)	123	164^{11}			s H_2O, tol; vs EtOH, eth; sl bz, DMSO
391	4-Aminophenol		C_6H_7NO	123-30-8	109.126	wh pl (w)	187.5	$110^{0.3}$			sl H_2O, tfa; vs EtOH; i bz, chl; s alk
392	*N*-(3-Aminophenyl)acetamide		$C_8H_{10}N_2O$	102-28-3	150.177	nd or pl (bz)	88				vs H_2O, EtOH, ace; sl eth, bz
393	*N*-(4-Aminophenyl)acetamide	*p*-Aminoacetanilide	$C_8H_{10}N_2O$	122-80-5	150.177	nd (w)	166.5	267			s H_2O; vs EtOH, eth
394	(4-Aminophenyl)arsonic acid	Arsanilic acid	$C_6H_8AsNO_3$	98-50-0	217.055	mcl nd (w, al)	232		1.9571^{10}		s H_2O, eth; sl EtOH, DMSO; i ace, bz
395	*N*-(4-Aminophenyl)-1,4-benzenediamine	4,4'-Diaminodiphenylamine	$C_{12}H_{13}N_3$	537-65-5	199.251	lf (w)	158	dec			vs eth, EtOH
396	2-Amino-1-phenylethanone	Phenacylamine	C_8H_9NO	613-89-8	135.163	ye cry	20	251		1.6160^{20}	i H_2O; s eth; sl ctc
397	1-(3-Aminophenyl)ethanone	*m*-Aminoacetophenone	C_8H_9NO	99-03-6	135.163	pa ye pl (al), lf (eth)	98.5	289.5			sl H_2O; s EtOH
398	1-(4-Aminophenyl)ethanone	*p*-Aminoacetophenone	C_8H_9NO	99-92-3	135.163	ye mcl pr (al)	106	294; 195^{15}			vs eth, EtOH
399	1-(4-Aminophenyl)-1-pentanone		$C_{11}H_{15}NO$	38237-74-0	177.243	cry (bz-peth)	74.5	161^{3}			i H_2O; s EtOH, eth
400	1-(4-Aminophenyl)-1-propanone	*p*-Aminopropiophenone	$C_9H_{11}NO$	70-69-9	149.189	pl (al, w), nd (w)	140				s DMSO
401	*N*-[(4-Aminophenyl)sulfonyl] acetamide	Sulfacetamide	$C_8H_{10}N_2O_3S$	144-80-9	214.241		183				sl H_2O; s EtOH; i eth; vs ace, alk
402	5-[(4-Aminophenyl)sulfonyl]-2-thiazolamine	Thiazolsulfone	$C_9H_9N_3O_2S_2$	473-30-3	255.316	nd (al)	220 dec				vs ace, eth, EtOH, diox
403	4-Aminophthalimide	5-Amino-1*H*-isoindole-1,3(2*H*)-dione	$C_8H_6N_2O_2$	3676-85-5	162.146			$224^{0.5}$			
404	3-Amino-1,2-propanediol, (±)		$C_3H_9NO_2$	13552-31-3	91.109			dec 265; 145^{9}	1.1752^{20}	1.4910^{25}	s H_2O, EtOH; i eth, bz
405	3-Aminopropanenitrile	3-Aminopropionitrile	$C_3H_6N_2$	151-18-8	70.093			185; 88^{20}	0.9584^{20}	1.4396^{20}	
406	2-Amino-1-propanol, (±)		C_3H_9NO	6168-72-5	75.109			174.5		1.4502^{20}	vs H_2O, EtOH, eth; sl chl

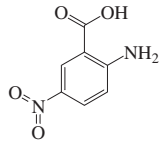

8-Amino-2-naphthalenesulfonic acid

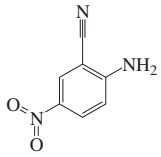

5-Amino-1-naphthol

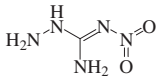

1-Amino-2-naphthol

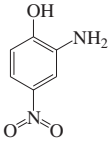

8-Amino-2-naphthol

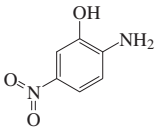

2-Amino-4-nitrobenzoic acid


2-Amino-5-nitrobenzoic acid


2-Amino-5-nitrobenzonitrile


3-Amino-1-nitroguanidine


2-Amino-4-nitrophenol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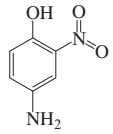
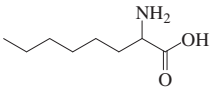
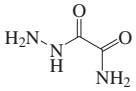
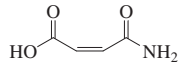
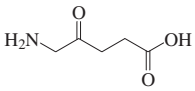
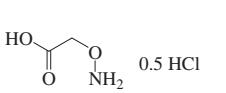

4-Amino-2-nitrophenol

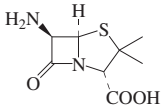

2-Aminooctanoic acid, (±)

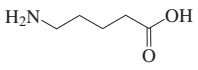

Aminooxoacetohydrazide


cis-4-Amino-4-oxo-2-butenoic acid

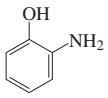

5-Amino-4-oxopentanoic acid

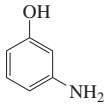

(Aminooxy)acetic acid, hydrochloride (2:1)

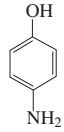

6-Aminopenicillanic acid

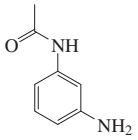

5-Aminopentanoic acid

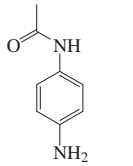

5-Amino-1-pentanol

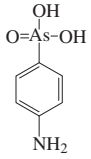

2-Aminophenol

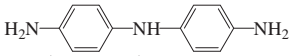

3-Aminophenol

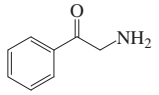

4-Aminophenol

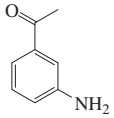

N-(3-Aminophenyl)acetamide

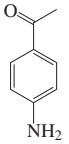

N-(4-Aminophenyl)acetamide

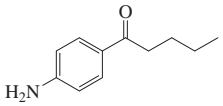

(4-Aminophenyl)arsonic acid

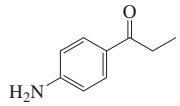

N-(4-Aminophenyl)-1,4-benzenediamine

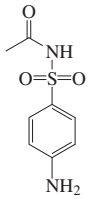

2-Amino-1-phenylethanone

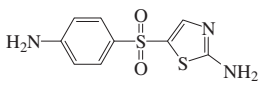

1-(3-Aminophenyl)ethanone

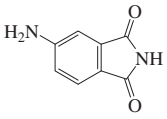

1-(4-Aminophenyl)ethanone

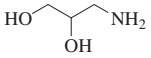

1-(4-Aminophenyl)-1-pentanone

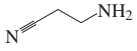

1-(4-Aminophenyl)-1-propanone

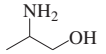

N-[(4-Aminophenyl)sulfonyl]acetamide


5-[(4-Aminophenyl)sulfonyl]-2-thiazolamine

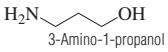

4-Aminophthalimide

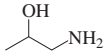

3-Amino-1,2-propanediol, (±)


3-Aminopropanenitrile


2-Amino-1-propanol, (±)

No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
407	3-Amino-1-propanol	Propanolamine	C_3H_9NO	156-87-6	75.109		12.4	187.5	0.9824^{25}	1.4617^{20}	s H_2O, EtOH, eth
408	1-Amino-2-propanol	Isopropanolamine	C_3H_9NO	1674-56-2	75.109		0.9	159.4	0.9611^{20}	1.4479^{20}	msc H_2O, EtOH, eth, ace, bz, ctc
409	α-(1-Aminopropyl) benzenemethanol	α-(α-Aminopropyl)benzyl alcohol	$C_{10}H_{15}NO$	5897-76-7	165.232	pl (bz-eth)	79.5				
410	*N*-(3-Aminopropyl)-*N*-methyl-1,3-propanediamine		$C_7H_{19}N_3$	105-83-9	145.246			$232.5; 112^{6}$	0.9023^{20}	1.4705^{25}	
411	Aminopropylon		$C_{16}H_{22}N_4O_2$	3690-04-8	302.372	pr (bz)	181				vs H_2O
412	4-(2-Aminopropyl)phenol, (±)	Hydroxyamphetamine	$C_9H_{13}NO$	1518-86-1	151.205	cry (bz)	125.5				s H_2O, EtOH, bz, chl, AcOEt
413	*N*-(3-Aminopropyl)-1,3-propanediamine	Bis(3-aminopropyl)amine	$C_6H_{17}N_3$	56-18-8	131.219		-14	151^{50}	0.938^{25}	1.4810^{20}	s chl
414	Aminopterin		$C_{19}H_{20}N_8O_5$	54-62-6	440.413	ye cry	262 dec				
415	4-Amino-*N*-pyrazinylbenzenesulfonamide	Sulfapyrazine	$C_{10}H_{10}N_4O_2S$	116-44-9	250.277	nd ($PhNO_2$)	251				i H_2O, EtOH, eth, bz, chl; s py; sl ace
416	3-Amino-1*H*-pyrazole-4-carbonitrile	3-Amino-4-cyanopyrazole	$C_4H_4N_4$	16617-46-2	108.102	cry (w)	173				
417	2-Amino-3-pyridinecarboxylic acid		$C_6H_6N_2O_2$	5345-47-1	138.124		296 dec				sl H_2O
418	6-Amino-3-pyridinecarboxylic acid	6-Aminonicotinic acid	$C_6H_6N_2O_2$	3167-49-5	138.124	cry (dil HOAc, +2w)	312				
419	4-Amino-*N*-2-pyridinylbenzenesulfonamide	Sulfapyridine	$C_{11}H_{11}N_3O_2S$	144-83-2	249.289	ye oran (al)	192				i H_2O, bz, ctc; s EtOH
420	5-Amino-2,4(1*H*,3*H*)-pyrimidinedione	5-Aminouracil	$C_4H_5N_3O_2$	932-52-5	127.102	nd (w)	dec				i H_2O; s alk, acid
421	6-Amino-2,4(1*H*,3*H*)-pyrimidinedione		$C_4H_5N_3O_2$	873-83-6	127.102	cry (w)	dec				vs H_2O
422	4-Amino-2(1*H*)-pyrimidinethione	2-Thiocytosine	$C_4H_5N_3S$	333-49-3	127.168						sl DMSO
423	5-Amino-2,4,6(1*H*,3*H*,5*H*)-pyrimidinetrione	Uramil	$C_4H_5N_3O_3$	118-78-5	143.101	nd or pl (w)	>400				s H_2O, chl; i eth, bz
424	4-Amino-*N*-2-pyrimidinylbenzenesulfonamide	Sulfadiazine	$C_{10}H_{10}N_4O_2S$	68-35-9	250.277	cry (w), wh pow	255 dec				sl H_2O, EtOH, ace, DMSO
425	Aminopyrine		$C_{13}H_{17}N_3O$	58-15-1	231.293	pr or pl (lig or AcOEt)	134.5				vs H_2O, bz, EtOH
426	4-Amino-*N*-2-quinoxalinylbenzenesulfonamide	Sulfaquinoxaline	$C_{14}H_{12}N_4O_2S$	59-40-5	300.336		247.5				sl H_2O, EtOH, ace; s aq alk
427	4-(Aminosulfonyl)benzoic acid	Carzenide	$C_7H_7NO_4S$	138-41-0	201.201	pr or lf (w)	291 dec				i H_2O; vs EtOH; sl eth; i bz
428	*N*-[4-(Aminosulfonyl)phenyl] acetamide	Acetylsulfanilamide	$C_8H_{10}N_2O_3S$	121-61-9	214.241	nd (HOAc)	219.5				s H_2O, EtOH, ace
429	5-Amino-1,3,4-thiadiazole-2(3*H*)-thione		$C_2H_3N_3S_2$	2349-67-9	133.195		243.0				
430	2-Amino-4(5*H*)-thiazolone		$C_3H_4N_2OS$	556-90-1	116.141	pr or nd (w)	256 dec				sl H_2O; i EtOH, eth
431	*N*-(Aminothioxomethyl)acetamide	Acetylthiourea	$C_3H_6N_2OS$	591-08-2	118.157	pr (w), orth (al)	165				sl H_2O, eth; s DMSO, EtOH
432	*N*-Amino-2-thioxo-4-thiazolidinone	3-Aminorhodanine	$C_3H_4N_2OS_2$	1438-16-0	148.206		101.5				s DMSO
433	1-Amino-2,2,2-trichloroethanol	Chloral ammonia	$C_2H_4Cl_3NO$	507-47-1	164.418	nd (al)	73	dec 100			vs bz, eth, EtOH
434	4-Amino-3,5,6-trichloro-2-pyridinecarboxlic acid	Picloram	$C_6H_3Cl_3N_2O_2$	1918-02-1	241.459		218.5				
435	11-Aminoundecanoic acid		$C_{11}H_{23}NO_2$	2432-99-7	201.307		189.0				
436	Amiton		$C_{10}H_{24}NO_3PS$	78-53-5	269.342	liq		$76^{0.01}$		1.4655^{27}	
437	Amitraz	*N*-Methylbis(2,4-xylyliminomethyl)amine	$C_{19}H_{23}N_3$	33089-61-1	293.406		86		1.128^{20}		
438	Amitriptyline		$C_{20}H_{23}N$	50-48-6	277.404	cry	196 (HCl)				
439	Ammonium ferric oxalate		$C_6H_{12}FeN_3O_{12}$	14221-47-7	374.017		165 dec		$1.78^{17.5}$		vs H_2O; i EtOH
440	Ammonium perfluorooctanoate		$C_8H_4F_{15}NO_2$	3825-26-1	431.100	solid					
441	Ammonium propanoate		$C_3H_9NO_2$	17496-08-1	91.109	hyg cry	45				s H_2O
442	Amobarbital	5-Ethyl-5-isopentyl-2,4,6(1*H*,3*H*,5*H*)-pyrimidinetrione	$C_{11}H_{18}N_2O_3$	57-43-2	226.272		157				vs bz, EtOH, chl
443	Amolanone	3-[2-(Diethylamino)ethyl]-3-phenyl-2(3*H*)-benzofuranone	$C_{20}H_{23}NO_2$	76-65-3	309.403	cry (peth)	43.4	$193^{2.0}$		1.5614^{25}	
444	Amoxicillin		$C_{16}H_{19}N_3O_5S$	26787-78-0	365.404	cry (w)					s H_2O
445	Amphecloral		$C_{11}H_{12}Cl_3N$	5581-35-1	264.579			$96.^{0.5}$		1.530	
446	Amphotericin B		$C_{47}H_{73}NO_{17}$	1397-89-3	924.080	ye pr (DMF)	170 dec				i H_2O; sl DMF; s DMSO
447	Ampicillin		$C_{16}H_{19}N_3O_4S$	69-53-4	349.405	cry	200 dec				sl H_2O
448	Ampyrone		$C_{11}H_{13}N_3O$	83-07-8	203.240	pa ye cry (bz)	109				s H_2O, EtOH, bz, chl; sl eth


3-Amino-1-propanol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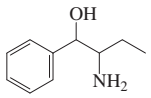
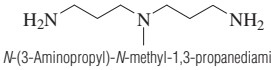
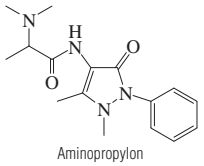
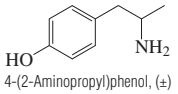
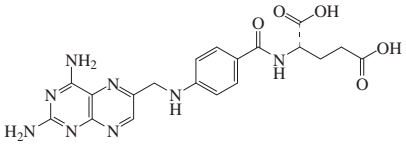

α-(1-Aminopropyl)benzenemethanol

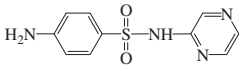

N-(3-Aminopropyl)-*N*-methyl-1,3-propanediamine

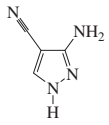

Aminopropylon

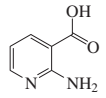

4-(2-Aminopropyl)phenol, (±)

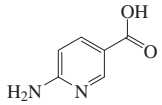
N-(3-Aminopropyl)-1,3-propanediamine

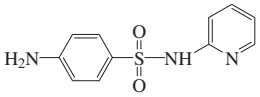

Aminopterin

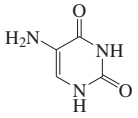

4-Amino-*N*-pyrazinylbenzenesulfonamide

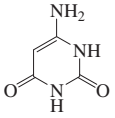

3-Amino-1*H*-pyrazole-4-carbonitrile

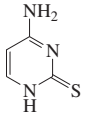

2-Amino-3-pyridinecarboxylic acid

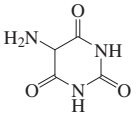

6-Amino-3-pyridinecarboxylic acid

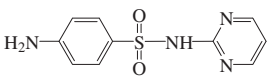

4-Amino-*N*-2-pyridinylbenzenesulfonamide

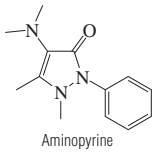

5-Amino-2,4(1*H*,3*H*)-pyrimidinedione

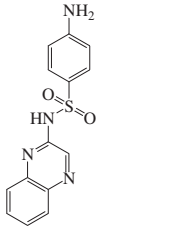

6-Amino-2,4(1*H*,3*H*)-pyrimidinedione

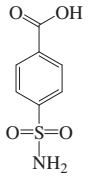

4-Amino-2(1*H*)-pyrimidinethione

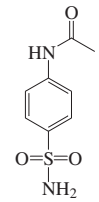

5-Amino-2,4,6(1*H*,3*H*,5*H*)-pyrimidinetrione

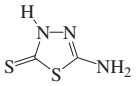

4-Amino-*N*-2-pyrimidinylbenzenesulfonamide

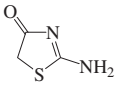

Aminopyrine

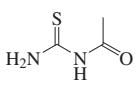

4-Amino-*N*-2-quinoxalinylbenzenesulfonamide

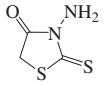

4-(Aminosulfonyl)benzoic acid

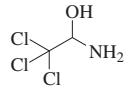

N-[4-(Aminosulfonyl)phenyl]acetamide

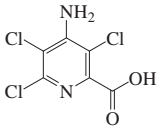

5-Amino-1,3,4-thiadiazole-2(3*H*)-thione

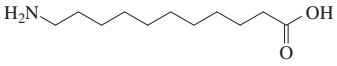

2-Amino-4(5*H*)-thiazolone

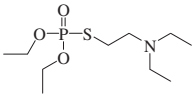

N-(Aminothioxomethyl)acetamide

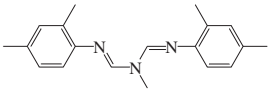

N-Amino-2-thioxo-4-thiazolidinone


1-Amino-2,2,2-trichloroethanol


4-Amino-3,5,6-trichloro-2-pyridinecarboxlic acid


11-Aminoundecanoic acid


Amiton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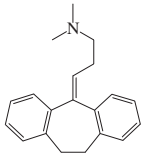
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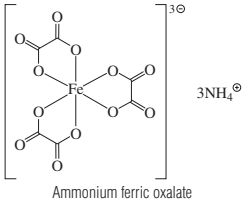
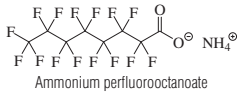
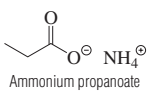
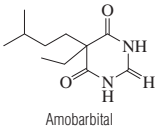
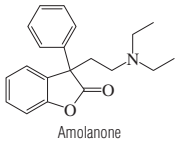
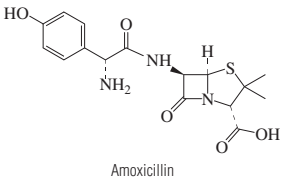

Ammonium ferric oxalate

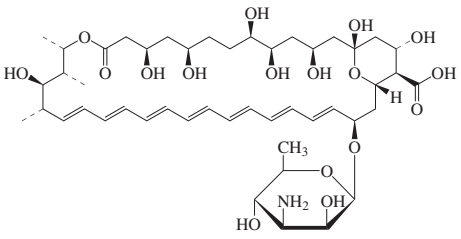

Ammonium perfluorooctanoate

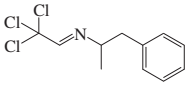

Ammonium propanoate


Amobarbital


Amolanone


Amoxicillin

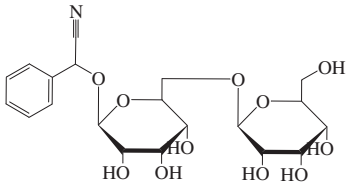

Amphotericin B

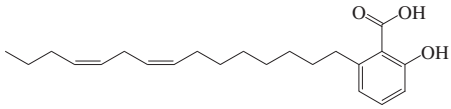

Amphecloral

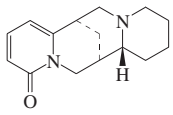
Ampicillin

Ampyrone

No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
449	Amygdalin		$C_{20}H_{27}NO_{11}$	29883-15-6	457.428		224.5				vs H_2O; sl EtOH; i eth, chl
450	Anacardic acid		$C_{22}H_{32}O_3$	11034-77-8	344.487	cry (ace)	35.5				vs eth, EtOH, peth
451	Anagyrine		$C_{15}H_{20}N_2O$	486-89-5	244.332	pe ye glass		265^{12}, 212^{4}			s H_2O, eth, bz; vs EtOH, chl; i lig
452	Androstane		$C_{19}H_{32}$	24887-75-0	260.457	lf (ace-MeOH)	50	60$^{0.003}$			vs ace, eth, EtOH, peth
453	Androstane-17-carboxylic acid, (5β,17β)	Etiocholanic acid	$C_{20}H_{32}O_2$	438-08-4	304.467	nd (gl HOAc)	228.5	sub 160			
454	Androstane-3,17-diol, (3α,5α,17β)	Epiandrostanediol	$C_{19}H_{32}O_2$	1852-53-5	292.456	nd (ace aq)	223				
455	5α-Androstane-3,17-dione		$C_{19}H_{28}O_2$	846-46-8	288.424	cry (MeOH)	135				
456	5β-Androstane-3,17-dione		$C_{19}H_{28}O_2$	1229-12-5	288.424	cry (ace-hx)	135				
457	Androst-4-ene-3,17-dione	4-Androstene-3,17-dione	$C_{19}H_{26}O_2$	63-05-8	286.408		143(form a); 173(form b)				
458	Androst-4-ene-3,11,17-trione	Adrenosterone	$C_{19}H_{24}O_3$	382-45-6	300.392	nd (al)	222	sub			sl H_2O; s EtOH, eth, ace, chl
459	Anemonin	*trans*-1,7-Dioxadispiro[4.0.4.2] dodeca-3,9-diene-2,8-dione	$C_{10}H_8O_4$	508-44-1	192.169	orth pl (chl) nd (al or bz)	158				vs chl
460	Anhalamine		$C_{11}H_{15}NO_3$	643-60-7	209.242	nd (al)	187.5				vs eth, EtOH
461	Anhalonidine		$C_{12}H_{17}NO_3$	17627-77-9	223.268	oct cry (bz, eth)	160.5				vs H_2O, EtOH
462	Anhalonine		$C_{12}H_{15}NO_3$	519-04-0	221.252	rhom nd	86	140$^{0.02}$			vs EtOH, bz, chl, eth, peth
463	2,5-Anhydro-3,4-dideoxyhexitol	Tetrahydro-2,5-furandimethanol	$C_6H_{12}O_3$	104-80-3	132.157		<-50	265	1.154^{20}		vs H_2O, ace, bz, EtOH
464	Anilazine	2,4-Dichloro-6-(*o*-chloroanilino)-*s*-triazine	$C_9H_5Cl_3N_4$	101-05-3	275.522		160		1.8^{20}		
465	Anileridine		$C_{22}H_{28}N_2O_2$	144-14-9	352.469	cry	83				s H_2O
466	Aniline	Benzenamine	C_6H_7N	62-53-3	93.127	oily liq	-6.02	184.17	1.0217^{20}	1.5863^{20}	s H_2O, ctc, lig; msc EtOH, eth, ace, bz
467	Aniline-2-carboxylic acid	*o*-Anthranilic acid	$C_7H_7NO_2$	118-92-3	137.137	lf (al)	146.5	sub	1.412^{20}		s H_2O, EtOH, eth; sl bz, tfa; vs chl, py
468	Aniline-3-carboxylic acid	*m*-Anthranilic acid	$C_7H_7NO_2$	99-05-8	137.137		173		1.51^{25}		sl H_2O, EtOH; s eth, tfa; vs ace; i bz
469	Aniline-4-carboxylic acid	*p*-Anthranilic acid	$C_7H_7NO_2$	150-13-0	137.137	mcl pr (w)	188.2		1.374^{20}		s H_2O, EtOH, eth; sl ace; i bz, chl
470	Aniline hydrobromide		C_6H_8BrN	542-11-0	174.039		286				
471	Aniline hydrochloride	Benzenamine hydrochloride	C_6H_8ClN	142-04-1	129.588	lf or nd	198		1.2215^{4}		vs H_2O, EtOH; i eth, chl; sl DMSO
472	Aniline nitrate		$C_6H_8N_2O_3$	542-15-4	156.139	orth	190 dec		1.356^{4}		vs H_2O, eth, EtOH
473	Aniline sulfate (2:1)		$C_{12}H_{16}N_2O_4S$	542-16-5	284.331				1.377^{4}		s H_2O; sl EtOH, tfa; i eth
474	Anisole	Methoxybenzene	C_7H_8O	100-66-3	108.138	liq	-37.13	153.7	0.9940^{20}	1.5174^{20}	i H_2O; s EtOH, eth, chl; vs ace, bz
475	Anisotropine methylbromide	Octatropine methylbromide	$C_{17}H_{32}BrNO_2$	80-50-2	362.346	cry (ace)	329				
476	Antazoline		$C_{17}H_{19}N_3$	91-75-8	265.353	cry	122				
477	Anthra[9,1,2-cde]benzo[rst] pentaphene-5,10-dione		$C_{34}H_{16}O_2$	116-71-2	456.490	viol-bl or blk nd ($PhNO_2$)	492 dec				i EtOH, bz, HOAc; s xyl, py, sulf
478	2-Anthracenamine		$C_{14}H_{11}N$	613-13-8	193.244	ye lf (al)	238.8	sub			i H_2O; s EtOH; i con sulf
479	Anthracene		$C_{14}H_{10}$	120-12-7	178.229	tab or mcl pr (al)	215.76	339.9	1.28^{25}		i H_2O; sl EtOH, eth, ace, bz, chl, ctc
480	9-Anthracenecarbonitrile		$C_{15}H_9N$	1210-12-4	203.239		177.5		1.3000^{20}		
481	9-Anthracenecarboxaldehyde		$C_{15}H_{10}O$	642-31-9	206.239	oran nd (dil HOAc)	104.5				i H_2O; s bz, HOAc
482	1-Anthracenecarboxylic acid	1-Anthroic acid	$C_{15}H_{10}O_2$	607-42-1	222.239	ye nd (HOAc) ye pr (al)	251.5	sub			i H_2O; s EtOH, eth; sl bz, chl
483	2-Anthracenecarboxylic acid	2-Anthroic acid	$C_{15}H_{10}O_2$	613-08-1	222.239	ye lf (al) nd, lf (sub)	281	sub			vs HOAc
484	9-Anthracenecarboxylic acid	9-Anthroic acid	$C_{15}H_{10}O_2$	723-62-6	222.239		217 dec	sub			i H_2O; s EtOH
485	9,10-Anthracenedicarbonitrile		$C_{16}H_8N_2$	1217-45-4	228.248		337 dec				
486	9,10-Anthracenediol		$C_{14}H_{10}O_2$	4981-66-2	210.228	br or ye nd	180				vs eth, EtOH


Amygdalin


Anacardic acid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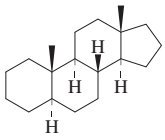
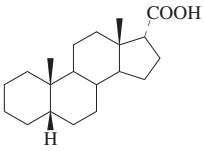
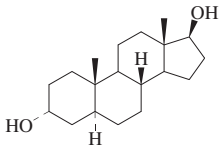
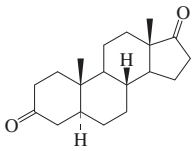
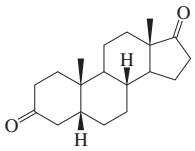

Androstane


Androstane-17-carboxylic acid, (5β,17β)


Androstane-3,17-diol, (3α,5α,17β)


5α-Androstane-3,17-dione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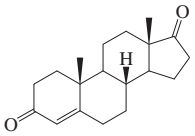
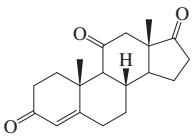
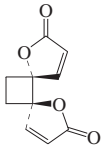
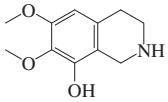
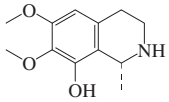
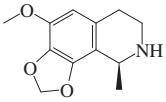

Androst-4-ene-3,17-dione

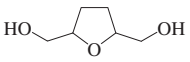

Androst-4-ene-3,11,17-trione

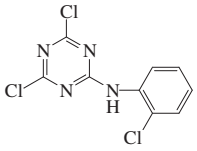

Anemonin

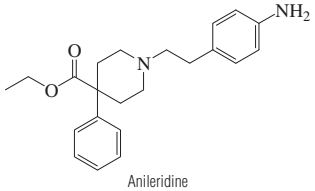

Anhalamine


Anhalonidine

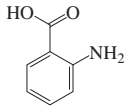

Anhalonine

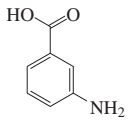

2,5-Anhydro-3,4-dideoxyhexitol

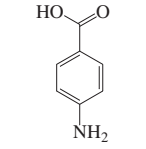

Anilazine

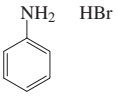

Anileridine

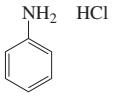

Aniline

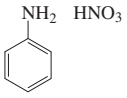

Aniline-2-carboxylic acid

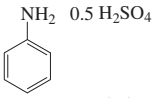

Aniline-3-carboxylic acid

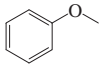

Aniline-4-carboxylic acid

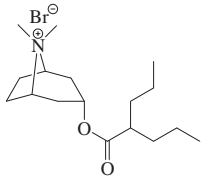

Aniline hydrobromide

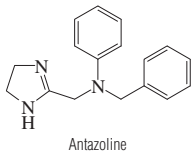

Aniline hydrochloride


Aniline nitrate

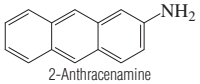

Aniline sulfate (2:1)

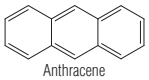

Anisole

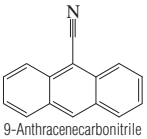

Anisotropine methylbromide

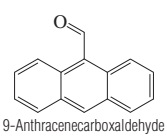

Antazoline

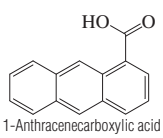

Anthra[9,1,2-cde]benzo[rst]pentaphene-5,10-dione

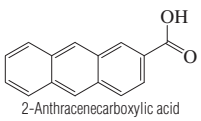

2-Anthracenamine

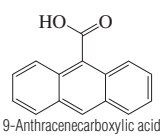

Anthracene

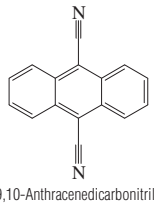

9-Anthracenecarbonitrile

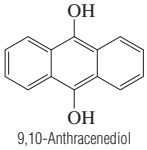

9-Anthracenecarboxaldehyde


1-Anthracenecarboxylic acid

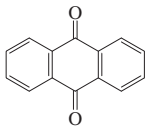

2-Anthracenecarboxylic acid

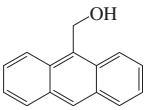

9-Anthracenecarboxylic acid

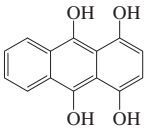

9,10-Anthracenedicarbonitrile

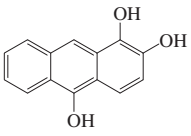

9,10-Anthracenediol

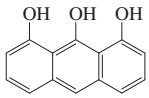
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
487	9,10-Anthracenedione	Anthraquinone	$C_{14}H_8O_2$	84-65-1	208.213	ye orth nd (al, bz)	286	377	1.438^{20}		i H_2O; sl EtOH, eth, bz, chl
488	9-Anthracenemethanol		$C_{15}H_{12}O$	1468-95-7	208.255		160.5				
489	1,4,9,10-Anthracenetetrol		$C_{14}H_{10}O_4$	476-60-8	242.227		148				
490	1,2,10-Anthracenetriol	Anthrarobin	$C_{14}H_{10}O_3$	577-33-3	226.227	ye lf, nd (al-w)	208				sl H_2O; vs EtOH, eth, ace; s bz
491	1,8,9-Anthracenetriol	Anthralin	$C_{14}H_{10}O_3$	1143-38-0	226.227	ye pl or nd (lig)	179				i H_2O; s EtOH, ace, bz; sl eth; vs py
492	1-Anthracenol		$C_{14}H_{10}O$	610-50-4	194.228	cry (bz), br nd or lf (al)	158	234^{13}			i H_2O; vs EtOH, eth; s NaOH
493	9-Anthracenol	Anthranol	$C_{14}H_{10}O$	529-86-2	194.228	ye red lf (dil al)	152				
494	9(10*H*)-Anthracenone	Anthrone	$C_{14}H_{10}O$	90-44-8	194.228	nd (bz-lig, HOAc)	155				s ace, bz, con sulf, dil alk
495	Antimony potassium tartrate trihydrate	Tartar emetic	$C_8H_{10}K_2O_{15}Sb_2$	28300-74-5	667.873	col cry			2.6		sl H_2O
496	Apholate		$C_{12}H_{24}N_9P_3$	52-46-0	387.300		148				
497	Aphylline		$C_{15}H_{24}N_2O$	577-37-7	248.364	cry	52.5	200^{4}			vs ace, bz, eth, EtOH
498	Apigenin	5,7-Dihydroxy-2-(4-hydroxyphenyl)-4*H*-1-benzopyran-4-one	$C_{15}H_{10}O_5$	520-36-5	270.237	ye nd (aq py)	347.5				i H_2O; s EtOH, py; vs dil alk
499	Apoatropine		$C_{17}H_{21}NO_2$	500-55-0	271.355	pr (chl)	62				sl H_2O, lig; vs EtOH, eth, ace, bz
500	Apocodeine		$C_{18}H_{19}NO_2$	641-36-1	281.350	pr (MeOH)	123.5				sl EtOH; s eth, ace, bz, lig
501	Apomorphine		$C_{17}H_{17}NO_2$	58-00-4	267.323	hex pl (chl-peth) rods (eth)	195 dec				sl H_2O; s EtOH, eth, ace, bz, alk
502	Apomorphine, hydrochloride		$C_{17}H_{18}ClNO_2$	314-19-2	303.784	grn in air mcl pr	205 dec				
503	Aprobarbital	5-Isopropyl-5-allyl-2,4,6(1*H*,3*H*,5*H*)-pyrimidinetrione	$C_{10}H_{14}N_2O_3$	77-02-1	210.229	cry	141				vs ace, eth, EtOH, chl
504	*L*-Arabinitol		$C_5H_{12}O_5$	7643-75-6	152.146		102.5				vs H_2O; sl EtOH; i eth
505	α-*D*-Arabinopyranose		$C_5H_{10}O_5$	608-45-7	150.130	cry (MeOH)	155.5		1.585^{25}		
506	6-*O*-α-*L*-Arabinopyranosyl-*D*-Glucose	Vicianose	$C_{11}H_{20}O_{10}$	14116-69-9	312.271	nd (dil al)	210 dec				vs H_2O
507	*DL*-Arabinose		$C_5H_{10}O_5$	20235-19-2	150.130	pr, nd (al)	164.5		1.585^{20}		vs H_2O; sl EtOH; i eth, bz
508	α-*D*-Arabinose		$C_5H_{10}O_5$	31178-68-4	150.130		156		1.585^{25}		vs H_2O; sl EtOH; i eth, ace, MeOH
509	β-*D*-Arabinose		$C_5H_{10}O_5$	31178-69-5	150.130		156		1.625^{25}		vs H_2O; sl EtOH; i eth, ace, MeOH
510	Aramite		$C_{15}H_{23}ClO_4S$	140-57-8	334.860		-37.3	195^{2}	1.143^{20}	1.5100^{20}	vs ace, bz, eth, EtOH
511	Arecaidine	1,2,5,6-Tetrahydro-1-methyl-3-pyridinecarboxylic acid	$C_7H_{11}NO_2$	499-04-7	141.168	pl (dil al) tab (dil al +1w)	232 dec				vs H_2O; i EtOH, eth, bz, chl
512	Arecoline		$C_8H_{13}NO_2$	63-75-2	155.195			209	1.0485^{20}	1.486^{-20}	msc H_2O, EtOH, eth; s chl
513	*D*-Arginine		$C_6H_{14}N_4O_2$	7200-25-1	174.201		217 dec				i H_2O, EtOH, eth, bz
514	*L*-Arginine		$C_6H_{14}N_4O_2$	74-79-3	174.201		244 dec				s H_2O; sl EtOH; i eth
515	*L*-Arginine, monohydrochloride		$C_6H_{15}ClN_4O_2$	1119-34-2	210.662		219				
516	Artemisin	8-Hydroxysantonin	$C_{15}H_{18}O_4$	481-05-0	262.302	cry	203	$260^{0.1}$			sl H_2O, chl; s AcOEt; i peth
517	Ascaridole	1-Methyl-4-isopropyl-2,3-dioxabicyclo[2.2.2]oct-5-ene	$C_{10}H_{16}O_2$	512-85-6	168.233	liq	3.3	exp; 115^{15}, $39^{0.2}$	1.0103^{20}	1.4769^{20}	i H_2O; s EtOH, ace, bz, tol; sl chl
518	*L*-Ascorbic acid	Vitamin C	$C_6H_8O_6$	50-81-7	176.124		191 dec		1.65^{25}		vs H_2O; s EtOH; i eth, bz, chl, peth
519	Ascorbyl palmitate	6-Hexadecanoylascorbic acid	$C_{22}H_{38}O_7$	137-66-6	414.533		112				
520	*L*-Asparagine	α-Aminosuccinamic acid	$C_4H_8N_2O_3$	70-47-3	132.118	orth (w+1)	235		1.543^{15}		s H_2O; i EtOH, eth, MeOH
521	*D*-Asparagine, monohydrate		$C_4H_{10}N_2O_4$	5794-24-1	150.133		215		1.523^{15}		sl H_2O; i EtOH, eth, bz, MeOH
522	*L*-Asparagine, monohydrate		$C_4H_{10}N_2O_4$	5794-13-8	150.133		234		1.543^{15}		sl H_2O; i EtOH, eth, bz, MeOH

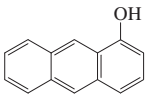

9,10-Anthracenedione

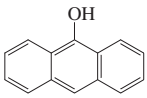

9-Anthracenemethanol


1,4,9,10-Anthracenetetrol


1,2,10-Anthracenetriol


1,8,9-Anthracenetriol


1-Anthracenol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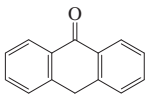
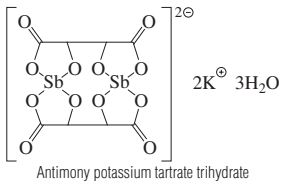
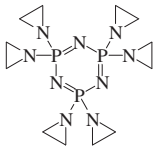
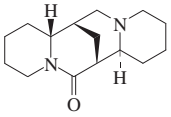
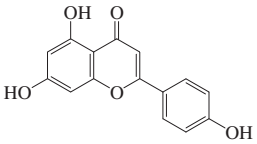
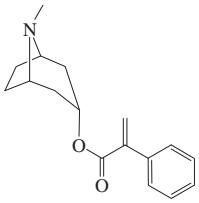

9(10*H*)-Anthracenone

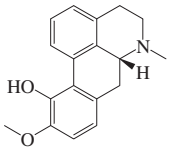

Antimony potassium tartrate trihydrate

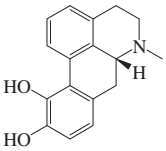

Apholate

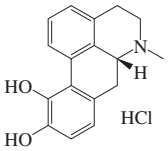

Aphylline

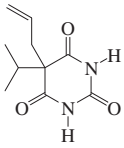

Apigenin

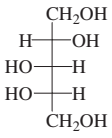

Apoatropine

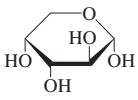

Apocodeine

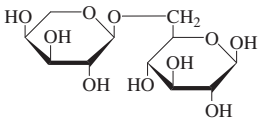

Apomorphine

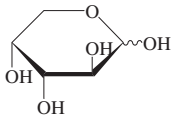

Apomorphine, hydrochloride

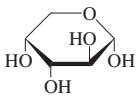

Aprobarbital

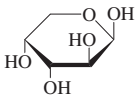

L-Arabinitol

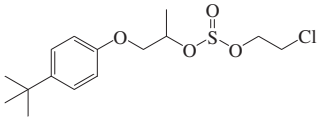

α-*D*-Arabinopyranose

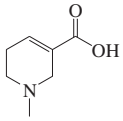

6-*O*-α-*L*-Arabinopyranosyl-*D*-Glucose

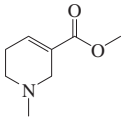

DL-Arabinose

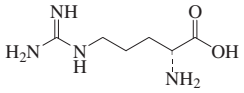

α-*D*-Arabinose

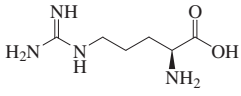

β-*D*-Arabinose

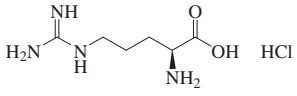

Aramite

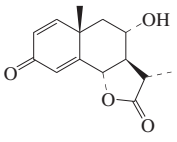

Arecaidine

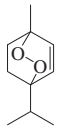

Arecoline

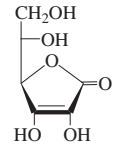

D-Arginine

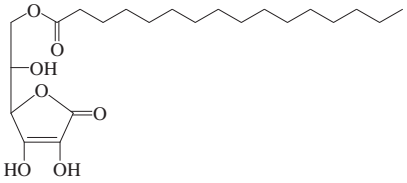

L-Arginine

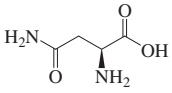

L-Arginine, monohydrochloride

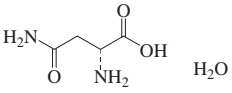

Artemisin

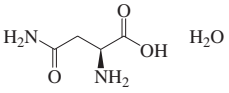

Ascaridole


L-Ascorbic acid

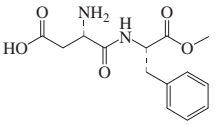

Ascorbyl palmitate

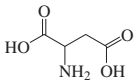

L-Asparagine

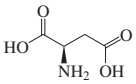

D-Asparagine, monohydrate

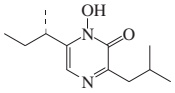

L-Asparagine, monohydrate

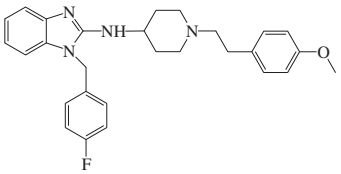
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
523	Aspartame	*L*-α-Aspartyl-*L*-phenylalanine, 2-methyl ester	$C_{14}H_{18}N_2O_5$	22839-47-0	294.303	nd (w)	246.5				
524	*DL*-Aspartic acid		$C_4H_7NO_4$	617-45-8	133.104	mcl pr (w)	277.5		1.6622^{13}		sl H_2O; i EtOH, eth, bz, py
525	*L*-Aspartic acid	*L*-Aminosuccinic acid	$C_4H_7NO_4$	56-84-8	133.104	orth lf (w)	270		1.6603^{13}		sl H_2O; i EtOH, eth, bz; s dil HCl, py
526	Aspergillic acid		$C_{12}H_{20}N_2O_2$	490-02-8	224.299	pa ye rods	98				vs bz, eth, EtOH
527	Astemizole		$C_{28}H_{31}FN_4O$	68844-77-9	458.570	wh cry	149.1				i H_2O; s os
528	Asulam	Methyl [(4-aminophenyl) sulfonyl]carbamate	$C_8H_{10}N_2O_4S$	3337-71-1	230.241		144				
529	Atenolol		$C_{14}H_{22}N_2O_3$	29122-68-7	266.336	cry (AcOEt)	147				sl H_2O, diox, ace; i chl; s MeOH, HOAc
530	Atisine	Anthorine	$C_{22}H_{33}NO_2$	466-43-3	343.503	orth bipym	58.5				vs eth, EtOH, chl
531	Atrazine		$C_8H_{14}ClN_5$	1912-24-9	215.684		173				
532	Atropine		$C_{17}H_{23}NO_3$	51-55-8	289.370	orth nd (dil al)	118.5	sub 95			vs H_2O, EtOH; i eth; sl chl
533	Auramine hydrochloride		$C_{17}H_{24}ClN_3O$	2465-27-2	321.845	ye nd (w)	267				sl H_2O
534	Aureothin		$C_{22}H_{23}NO_6$	2825-00-5	397.421	ye pr	158				vs ace, EtOH, chl
535	Aurin		$C_{19}H_{14}O_3$	603-45-2	290.312	dk red lf or orth	309 dec				i H_2O, bz; s EtOH, alk; sl eth, chl
536	Aurin tricarboxylic acid, triammonium salt	Aluminon	$C_{22}H_{23}N_3O_9$	569-58-4	473.433	red-br pow					s H_2O; sl EtOH; i peth
537	Avermectin B1a	Abamectin	$C_{48}H_{72}O_{14}$	71751-41-2	873.078		152				
538	3-Azabicyclo[3.2.2]nonane		$C_8H_{15}N$	283-24-9	125.212			166^{500}			
539	1-Azabicyclo[2.2.2]octane	Quinuclidine	$C_7H_{13}N$	100-76-5	111.185	cry (eth)	158				vs H_2O, ace, eth, EtOH
540	1-Azabicyclo[2.2.2]octan-3-ol	3-Quinuclidinol	$C_7H_{13}NO$	1619-34-7	127.184	cry (bz)	221	sub 120			s ace
541	Azacitidine	4-Amino-1-β-*D*-ribofuranosyl-1,3,5-triazine-2(1*H*)-one	$C_8H_{12}N_4O_5$	320-67-2	244.205	cry	229				
542	Azacyclotridecan-2-one		$C_{12}H_{23}NO$	947-04-6	197.317		152.5				
543	8-Azaguanine		$C_4H_4N_6O$	134-58-7	152.114		300				
544	Azaserine		$C_5H_7N_3O_4$	115-02-6	173.128	ye-grn orth cry	150 dec				vs H_2O; sl EtOH, ace, MeOH
545	Azathioprine	6-[(1-Methyl-4-nitro-1*H*-imidazol-5-yl)thio]-1*H*-purine	$C_9H_7N_7O_2S$	446-86-6	277.263	ye cry	243 dec				sl H_2O, EtOH, chl
546	6-Azauridine	2-β-*D*-Ribofuranosyl-1,2,4-triazine-3,5(2*H*,4*H*)-dione	$C_8H_{11}N_3O_6$	54-25-1	245.189		158				s H_2O
547	Azetidine		C_3H_7N	503-29-7	57.095	liq	-70.0	63	0.8436^{20}	1.4287^{25}	vs ace, bz, eth, EtOH
548	2-Azetidinecarboxylic acid		$C_4H_7NO_2$	2517-04-6	101.105	cry (95% MeOH)	217 dec				
549	2-Azetidinone		C_3H_5NO	930-21-2	71.078		73.5	106^{15}			vs eth, EtOH, chl
550	Azidobenzene		$C_6H_5N_3$	622-37-7	119.124	pa ye oil	-27.5	70^{11}	1.0860^{20}	1.5589^{25}	i H_2O; sl EtOH, eth
551	1-Azido-4-chlorobenzene		$C_6H_4ClN_3$	3296-05-7	153.569		20	96^{20}	1.2634^{25}		i H_2O; s eth
552	2-Azidoethanol		$C_2H_5N_3O$	1517-05-1	87.080			75^{40}	1.146^{24}		vs H_2O
553	1-Azido-4-methylbenzene		$C_7H_7N_3$	2101-86-2	133.151		-29.0	dec 180; 80^{10}	1.0527^{23}		vs eth, EtOH
554	(Azidomethyl)benzene		$C_7H_7N_3$	622-79-7	133.151			108^{23}, 78^{12}	1.0730^{19}	1.5341^{25}	i H_2O; msc EtOH, eth
555	Azinphos ethyl		$C_{12}H_{16}N_3O_3PS_2$	2642-71-9	345.377	nd	53	111$^{0.001}$	1.284^{20}		reac alk
556	Azinphos-methyl		$C_{10}H_{12}N_3O_3PS_2$	86-50-0	317.324		73		1.44^{20}		
557	1-Aziridineethanol		C_4H_9NO	1072-52-2	87.120			168	1.088^{25}	1.4560^{20}	
558	*trans*-Azobenzene	*trans*-Diphenyldiazene	$C_{12}H_{10}N_2$	17082-12-1	182.220	oran-red mcl lf (al)	67.88	293	1.203^{20}	1.6266^{78}	sl H_2O; s EtOH, eth, bz, chl; vs py
559	*cis*-Azobenzene	*cis*-Diphenyldiazene	$C_{12}H_{10}N_2$	1080-16-6	182.220	oran-red pl (peth)	71				sl H_2O; s EtOH, eth, bz, HOAc, lig
560	3,3'-Azobenzenedisulfonyl chloride		$C_{12}H_8Cl_2N_2O_4S_2$	104115-88-0	379.239	red nd (eth)	166.5				vs eth
561	1,1'-Azobiscyclohexanecarbonitrile		$C_{14}H_{20}N_4$	2094-98-6	244.336		100				i H_2O; s lig
562	2,2'-Azobis[isobutyronitrile]	2,2'-Azobis[2-methylpropionitrile]	$C_8H_{12}N_4$	78-67-1	164.208						i H_2O; sl EtOH, eth
563	Azobutane		$C_8H_{18}N_2$	2159-75-3	142.242			60^{18}			
564	Azopropane		$C_6H_{14}N_2$	821-67-0	114.188			114			
565	*cis*-Azoxybenzene	Diphenyldiazene 1-oxide, (*E*)	$C_{12}H_{10}N_2O$	21650-65-7	198.219		87		1.166^{20}	1.633^{20}	


Aspartame


DL-Aspartic acid


L-Aspartic acid


Aspergillic acid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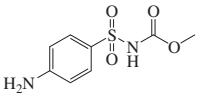
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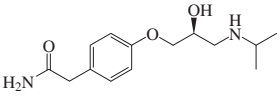
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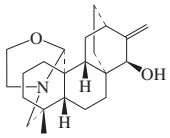
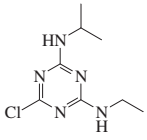

Atisine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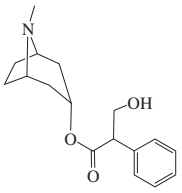
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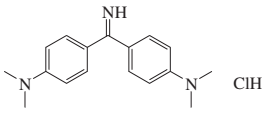
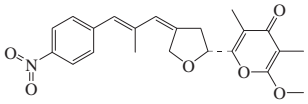

Auramine hydrochloride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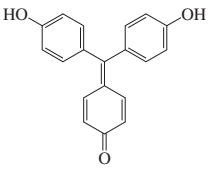
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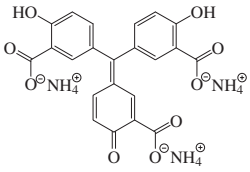
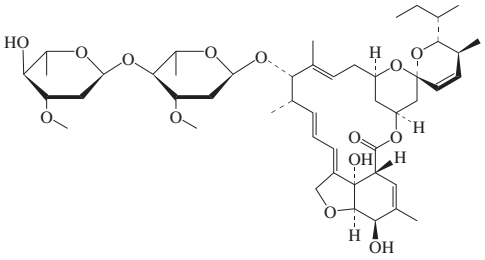
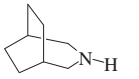
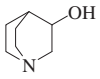
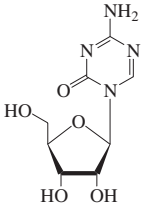

Aurin tricarboxylic acid, triammonium salt

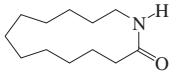

Avermectin B1a

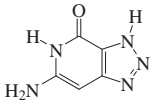

3-Azabicyclo[3.2.2]nonane

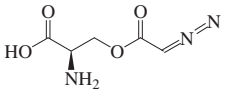

1-Azabicyclo[2.2.2]octane

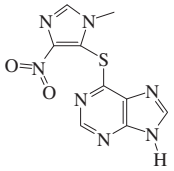

1-Azabicyclo[2.2.2]octan-3-ol

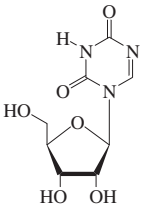

Azacitidine


Azacyclotridecan-2-one

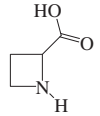

8-Azaguanine


Azaserine

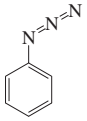

Azathioprine

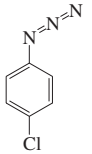

6-Azauridine

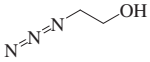

Azetidine

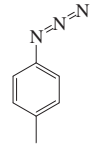

2-Azetidinecarboxylic acid

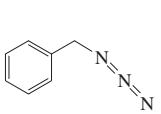

2-Azetidinone

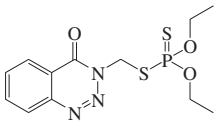

Azidobenzene

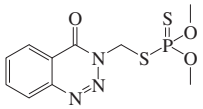

1-Azido-4-chlorobenzene

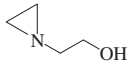

2-Azidoethanol

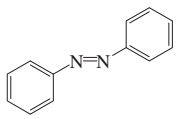

1-Azido-4-methylbenzene

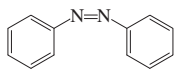

(Azidomethyl)benzene

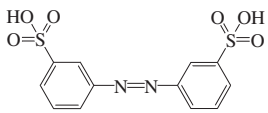

Azinphos ethyl

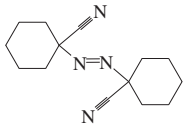

Azinphos-methyl

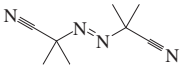

1-Aziridineethanol


trans-Azobenzene


cis-Azobenzene


3,3'-Azobenzenedisulfonyl chloride


1,1'-Azobiscyclohexanecarbonitrile

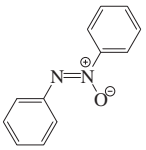

2,2'-Azobis[isobutyronitrile]

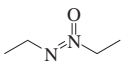
Azobutane

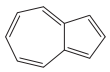
Azopropane

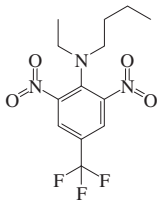
cis-Azoxybenzene

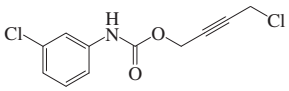
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
566	*trans*-Azoxybenzene	Diphenyldiazene 1-oxide, (*Z*)	$C_{12}H_{10}N_2O$	20972-43-4	198.219		34.6		1.1590^{25}		i H_2O; s EtOH, eth
567	Azoxyethane	Diethyldiazine 1-oxide	$C_4H_{10}N_2O$	16301-26-1	102.134	liq		46			
568	Azulene	Bicyclo[5.3.0]decapentaene	$C_{10}H_8$	275-51-4	128.171	bl or gr-blk lf (al)	99	dec 270; 125^{10}			i H_2O; s EtOH, eth, ace, acid; sl chl
569	Balan	*N*-Butyl-*N*-ethyl-2,6-dinitro-4-(trifluoromethyl)aniline	$C_{13}H_{16}F_3N_3O_4$	1861-40-1	335.279		66	121$^{0.5}$, 148^{7}			
570	Barban		$C_{11}H_9Cl_2NO_2$	101-27-9	258.101		75				
571	Barbital	5,5-Diethylbarbituric acid	$C_8H_{12}N_2O_3$	57-44-3	184.192	nd (w)	190		1.220^{25}		sl H_2O; s EtOH, eth, ace, chl, lig, tfa
572	Barbituric acid		$C_4H_4N_2O_3$	67-52-7	128.086	orth pr (w +2)	248	dec 260			s H_2O, eth; sl EtOH
573	Bayleton	Triadimefon	$C_{14}H_{16}ClN_3O_2$	43121-43-3	293.749		82		1.22^{20}		
574	Bebeerine		$C_{36}H_{38}N_2O_6$	477-60-1	594.696	cry (bz, eth, chl-MeOH)	221				s EtOH, MeOH, eth; vs ace, chl
575	Benactyzine	2-(Diethylamino)ethyl benzilate	$C_{20}H_{25}NO_3$	302-40-9	327.418	cry	51				
576	Benactyzine hydrochloride	2-Diethylaminoethyl benzilate hydrochloride	$C_{20}H_{26}ClNO_3$	57-37-4	363.878		177.5				s H_2O; i eth
577	Benalaxyl		$C_{20}H_{23}NO_3$	71626-11-4	325.402		79		1.27^{25}		
578	Bendiocarb	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methylcarbamate	$C_{11}H_{13}NO_4$	22781-23-3	223.226		130		1.25^{20}		
579	Bendroflumethiazide		$C_{15}H_{14}F_3N_3O_4S_2$	73-48-3	421.415	cry	225				i H_2O, bz, eth; s EtOH, ace
580	Benomyl		$C_{14}H_{18}N_4O_3$	17804-35-2	290.318		dec				
581	Bensulfuron-methyl		$C_{16}H_{18}N_4O_7S$	83055-99-6	410.402		187				
582	Bensulide		$C_{14}H_{24}NO_4PS_3$	741-58-2	397.514		34.4		1.224^{20}		
583	Bentazon		$C_{10}H_{12}N_2O_3S$	25057-89-0	240.278		138				
584	Benz[c]acridine	12-Azabenz[a]anthracene	$C_{17}H_{11}N$	225-51-4	229.276	nd (dil al)	132				vs bz, eth, EtOH
585	Benzaldehyde	Benzenecarboxaldehyde	C_7H_6O	100-52-7	106.122	liq	-57.1	178.8	1.0401^{25}	1.5463^{20}	sl H_2O; msc EtOH, eth; vs ace, bz
586	Benzaldehyde hydrazone	Benzylidene hydrazine	$C_7H_8N_2$	5281-18-5	120.152	lf	16	140^{14}			s EtOH
587	*cis*-Benzaldehyde oxime		C_7H_7NO	622-32-2	121.137	pr	36.5	200	1.1111^{20}	1.5908^{20}	vs bz, eth, EtOH
588	*trans*-Benzaldehyde oxime		C_7H_7NO	622-31-1	121.137	nd (eth)	35	119^{10}	1.145^{20}		s H_2O; vs EtOH, eth
589	Benzaldehyde, phenylhydrazone		$C_{13}H_{12}N_2$	588-64-7	196.247	nd (lig), pr	157.0				sl EtOH, eth; s ace, bz, liq NH_3
590	Benzaldehyde, (phenylmethylene) hydrazone		$C_{14}H_{12}N_2$	588-68-1	208.258	ye pr (al)	93				i H_2O; s EtOH, eth, ace, bz, chl; sl ctc
591	Benzamide	Benzoic acid amide	C_7H_7NO	55-21-0	121.137	mcl pr or pl (w)	127.3	290	1.0792^{130}		sl H_2O, eth, bz; vs EtOH, ctc, CS_2
592	Benz[a]anthracene	1,2-Benzanthracene	$C_{18}H_{12}$	56-55-3	228.288	lf (al)	160.5	438			i H_2O; vs EtOH
593	Benz[a]anthracene-7,12-dione		$C_{18}H_{10}O_2$	2498-66-0	258.271		170.5				sl EtOH, eth, lig; s ace; vs bz, chl
594	Benzanthrone		$C_{17}H_{10}O$	82-05-3	230.260		170				sl bz
595	Benzene	[6]Annulene	C_6H_6	71-43-2	78.112	orth pr or liq	5.49	80.09	0.8765^{20}	1.5011^{20}	sl H_2O; msc EtOH, eth, ace, chl; s ctc
596	Benzeneacetaldehyde	Phenylacetaldehyde	C_8H_8O	122-78-1	120.149		33.5	195	1.0272^{20}	1.5255^{20}	sl H_2O; s ace; msc EtOH, eth
597	Benzeneacetamide	α-Phenylacetamide	C_8H_9NO	103-81-1	135.163		157				sl H_2O, eth, bz; s EtOH
598	Benzeneacetic acid	Phenylacetic acid	$C_8H_8O_2$	103-82-2	136.149	lf, pl (peth)	76.5	265.5	1.228^{6}		sl H_2O, chl; vs EtOH, eth; s ace; i lig
599	Benzeneacetic acid, hydrazide		$C_8H_{10}N_2O$	937-39-3	150.177		115.5				
600	Benzeneacetic anhydride		$C_{16}H_{14}O_3$	1555-80-2	254.280	pr or nd (eth)	73.3	195^{12}			vs eth, chl
601	Benzeneacetonitrile	Benzyl cyanide	C_8H_7N	140-29-4	117.149	liq	-23.8	233.5	1.0205^{15}	1.5211^{25}	
602	Benzeneacetyl chloride	Phenylacetyl chloride	C_8H_7ClO	103-80-0	154.594			170^{250}, 105^{24}	1.1682^{20}	1.5325^{20}	vs eth
603	Benzenearsonic acid		$C_6H_7AsO_3$	98-05-5	202.040	cry (w)	158 dec				vs H_2O, EtOH
604	Benzeneboronic acid		$C_6H_7BO_2$	98-80-6	121.930		219				sl H_2O; s EtOH, eth, bz
605	Benzenebutanoic acid		$C_{10}H_{12}O_2$	1821-12-1	164.201	lf (w)	52	290			s H_2O, EtOH, eth
606	Benzenebutanol		$C_{10}H_{14}O$	3360-41-6	150.217			140^{14}		1.5214^{20}	
607	Benzenecarboperoxoic acid	Perbenzoic acid	$C_7H_6O_3$	93-59-4	138.121	mcl pl (peth)	42	100^{14}			vs ace, bz, eth, EtOH
608	Benzenecarbothioamide		C_7H_7NS	2227-79-4	137.203		117				


trans-Azoxybenzene


Azoxyethane


Azulene


Balan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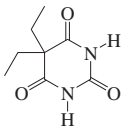
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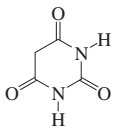
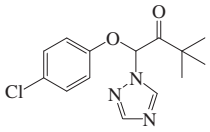

Barbituric acid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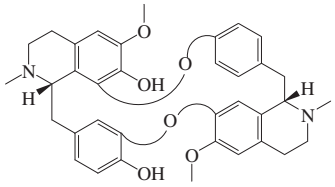
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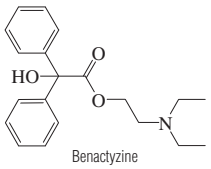
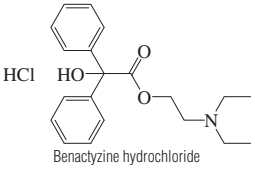

Benactyzine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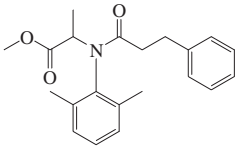
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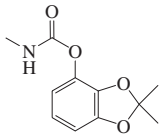
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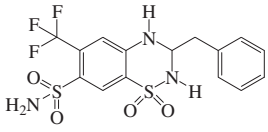
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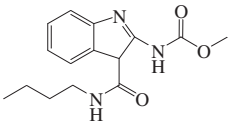
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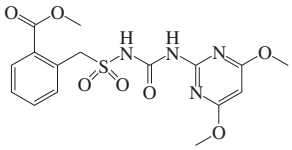
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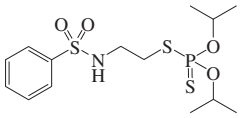
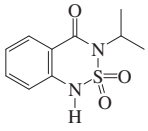

Bensulide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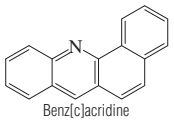
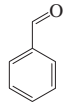
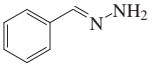
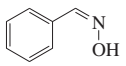
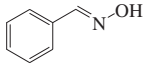
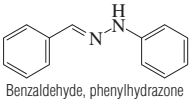

Benz[c]acridine

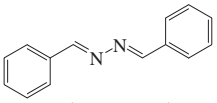

Benzaldehyde

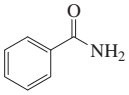

Benzaldehyde hydrazone


cis-Benzaldehyde oxime


trans-Benzaldehyde oxime


Benzaldehyde, phenylhydrazone


Benzaldehyde, (phenylmethylene)hydrazone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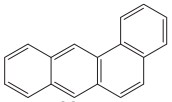
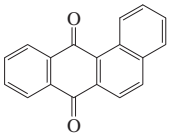
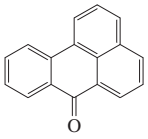
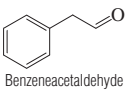
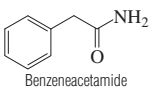

Benz[a]anthracene

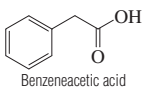

Benz[a]anthracene-7,12-dione

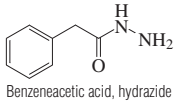

Benzanthrone

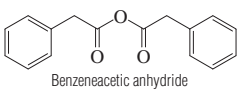

Benzene


Benzeneacetaldehyde


Benzeneacetamide


Benzeneacetic acid


Benzeneacetic acid, hydrazide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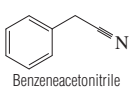
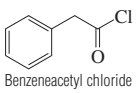

Benzeneacetonitrile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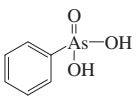
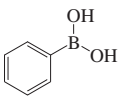
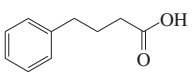

Benzenearsonic acid


Benzeneboronic acid

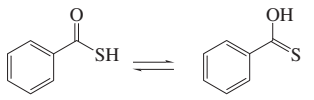

Benzenebutanoic acid

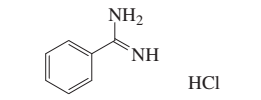
Benzenebutanol

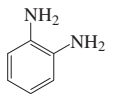
Benzenecarboperoxoic acid

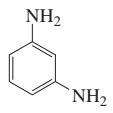
Benzenecarbothioamide

No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
609	Benzenecarbothioic acid		C_7H_6OS	98-91-9	138.187	ye pl (HOAc)	24	86[10]	1.28[20]	1.6040[20]	vs ace, bz, eth, EtOH
610	Benzenecarboximidamide, monohydrochloride		$C_7H_9ClN_2$	1670-14-0	156.612	orth pr (w +2)	169				s H_2O, EtOH; sl tfa
611	1,2-Benzenediamine	*o*-Phenylenediamine	$C_6H_8N_2$	95-54-5	108.141	brsh ye lf (w) pl (chl)	102.1	257			s H_2O, eth, bz, chl; vs EtOH
612	1,3-Benzenediamine	*m*-Phenylenediamine	$C_6H_8N_2$	108-45-2	108.141	orth (al)	66.0	285	1.0096[58]	1.6339[58]	vs H_2O; s EtOH, eth, bz
613	1,4-Benzenediamine	*p*-Phenylenediamine	$C_6H_8N_2$	106-50-3	108.141	wh pl (bz, eth)	141.1	267			sl H_2O; s EtOH, eth, bz, chl
614	1,2-Benzenediamine, dihydrochloride		$C_6H_{10}Cl_2N_2$	615-28-1	181.062		250 dec				
615	1,3-Benzenediamine, dihydrochloride		$C_6H_{10}Cl_2N_2$	541-69-5	181.062						s H_2O
616	1,4-Benzenediamine, dihydrochloride		$C_6H_{10}Cl_2N_2$	624-18-0	181.062						s H_2O
617	1,2-Benzenedicarbonyl dichloride	Phthaloyl chloride	$C_8H_4Cl_2O_2$	88-95-9	203.023		15.5	281.1	1.4089[20]	1.5684[20]	
618	1,3-Benzenedicarbonyl dichloride		$C_8H_4Cl_2O_2$	99-63-8	203.023	pr(eth)	43.5	276	1.3880[17]	1.570[47]	sl H_2O, EtOH; s eth
619	1,4-Benzenedicarbonyl dichloride		$C_8H_4Cl_2O_2$	100-20-9	203.023	nd or pl (lig)	83.5	258; 125[9]			s eth
620	1,2-Benzenedicarboxaldehyde		$C_8H_6O_2$	643-79-8	134.133	ye cry or nd (lig)	55.8	83[0.8]			vs eth, EtOH
621	1,3-Benzenedicarboxaldehyde		$C_8H_6O_2$	626-19-7	134.133	nd (dil al)	89.5	246; 136[13]			sl H_2O, eth, chl; vs EtOH; s ace, bz
622	1,4-Benzenedicarboxaldehyde		$C_8H_6O_2$	623-27-8	134.133	nd (w)	117	246			sl H_2O; vs EtOH; s eth, chl, alk
623	1,2-Benzenedicarboxamide	Phthalamide	$C_8H_8N_2O_2$	88-96-0	164.162	cry	222	dec			sl H_2O, EtOH; i eth
624	1,4-Benzenedicarboxamide		$C_8H_8N_2O_2$	3010-82-0	164.162	nd (w), pl (HOAc)	322.3				
625	1,2-Benzenedicarboxylic acid, bis(2-butoxyethyl) ester	Bis(2-butoxyethyl) phthalate	$C_{20}H_{30}O_6$	117-83-9	366.448			270			
626	1,2-Benzenedicarboxylic acid, bis(2-methoxyethyl) ester	Bis(2-methoxyethyl) phthalate	$C_{14}H_{18}O_6$	117-82-8	282.289		-60.0	230[10]	1.1596[20]		
627	1,2-Benzenedicarboxylic acid, diallyl ester	Diallyl phthalate	$C_{14}H_{14}O_4$	131-17-9	246.259			161[4]			
628	1,2-Benzenedicarboxylic acid, dipropyl ester	Dipropyl phthalate	$C_{14}H_{18}O_4$	131-16-8	250.291	liq	-31.0	304.5	1.0767[20]		i H_2O; s EtOH, eth
629	1,3-Benzenedimethanamine	*m*-Xylene diamine	$C_8H_{12}N_2$	1477-55-0	136.194			247	1.052[20]		vs H_2O, eth, EtOH
630	1,2-Benzenedimethanol		$C_8H_{10}O_2$	612-14-6	138.164	pl (eth, peth)	64.8	145[3]			s H_2O, EtOH; vs eth; sl bz
631	1,3-Benzenedimethanol		$C_8H_{10}O_2$	626-18-6	138.164	nd (bz)	57	156[13]	1.1610[18]		vs H_2O, eth, EtOH
632	1,4-Benzenedimethanol		$C_8H_{10}O_2$	589-29-7	138.164	nd (w)	117.5	140[1]			vs H_2O, ace, eth, EtOH
633	1,2-Benzenediol, diacetate		$C_{10}H_{10}O_4$	635-67-6	194.184	nd (al)	64.5	142[9]			i H_2O; vs EtOH, eth, chl; s peth
634	1,4-Benzenediol, diacetate		$C_{10}H_{10}O_4$	1205-91-0	194.184	pl (w, al)	123.5		0.8731[25]		s H_2O; vs EtOH, eth, chl, lig
635	1,3-Benzenediol, monobenzoate		$C_{13}H_{10}O_3$	136-36-7	214.216		134.5				
636	1,3-Benzenedisulfonic acid		$C_6H_6O_6S_2$	98-48-6	238.238	hyg cry					
637	1,3-Benzenedisulfonyl dichloride		$C_6H_4Cl_2O_4S_2$	585-47-7	275.130		61.8	195[10.5]			
638	1,2-Benzenedithiol		$C_6H_6S_2$	17534-15-5	142.242		28.5	238.5			vs EtOH, eth, bz; s AcOEt
639	1,3-Benzenedithiol		$C_6H_6S_2$	626-04-0	142.242	lf	27	245			vs bz, eth, EtOH
640	Benzeneethanamine	1-Amino-2-phenylethane	$C_8H_{11}N$	64-04-0	121.180	liq	<0	195	0.9640[25]	1.5290[25]	s H_2O, ctc; vs EtOH, eth
641	Benzeneethanamine, hydrochloride		$C_8H_{12}ClN$	156-28-5	157.641	pl or lf (al)	218.5				vs H_2O, EtOH
642	Benzeneethanol	Phenethyl alcohol	$C_8H_{10}O$	60-12-8	122.164	liq	-27	218.2	1.0202[20]	1.5325[20]	sl H_2O; msc EtOH, eth
643	Benzenehexacarboxylic acid	Mellitic acid	$C_{12}H_6O_{12}$	517-60-2	342.169	nd (al)	287 dec				vs H_2O; s EtOH, sulf
644	Benzenemethanamine, hydrochloride		$C_7H_{10}ClN$	3287-99-8	143.614		258.3				vs H_2O, EtOH
645	Benzenemethanesulfonyl chloride		$C_7H_7ClO_2S$	1939-99-7	190.648	pr (eth), nd (bz)	93				vs eth, bz
646	Benzenemethanesulfonyl fluoride		$C_7H_7FO_2S$	329-98-6	174.193		92.0				
647	Benzenemethanethiol	Thiobenzyl alcohol	C_7H_8S	100-53-8	124.204	liq	-30	194.5	1.058[20]	1.5151[20]	i H_2O; vs EtOH, eth; sl ctc; s CS_2
648	Benzenepentanoic acid	5-Phenylvaleric acid	$C_{11}H_{14}O_2$	2270-20-4	178.228	pl (w), pr (peth)	57.5	190[30]			sl H_2O; vs EtOH; s os
649	Benzenepentanol		$C_{11}H_{16}O$	10521-91-2	164.244			155[20], 150[18]	0.9725[20]	1.5156[20]	vs eth, EtOH


Benzenecarbothioic acid


Benzenecarboximidamide, monohydrochloride


1,2-Benzenediamine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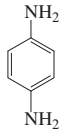
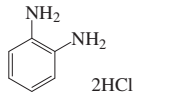
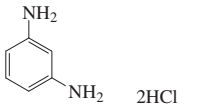
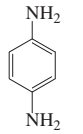
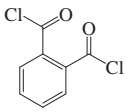
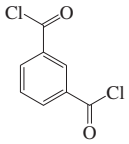

1,4-Benzenediamine

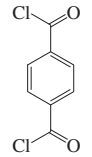

1,2-Benzenediamine, dihydrochloride

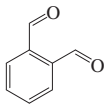

1,3-Benzenediamine, dihydrochloride

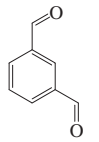

1,4-Benzenediamine, dihydrochloride


1,2-Benzenedicarbonyl dichloride


1,3-Benzenedicarbonyl dichloride


1,4-Benzenedicarbonyl dichloride


1,2-Benzenedicarboxaldehyde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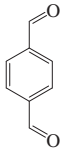
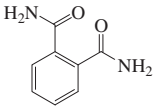
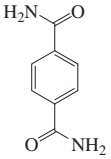
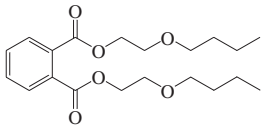
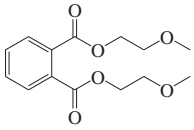
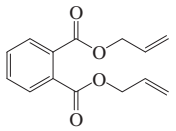

1,4-Benzenedicarboxaldehyde

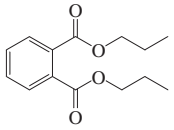

1,2-Benzenedicarboxamide

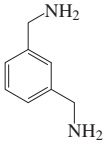

1,4-Benzenedicarboxamide

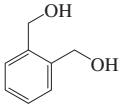

1,2-Benzenedicarboxylic acid, bis(2-butoxyethyl) ester

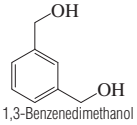

1,2-Benzenedicarboxylic acid, bis(2-methoxyethyl) ester

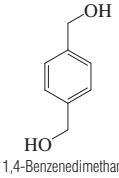

1,2-Benzenedicarboxylic acid, diallyl ester

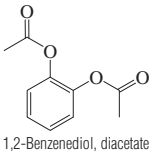

1,2-Benzenedicarboxylic acid, dipropyl ester

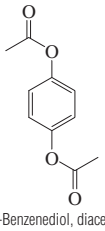

1,3-Benzenedimethanamine

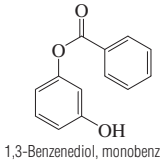

1,2-Benzenedimethanol

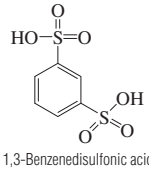

1,3-Benzenedimethanol

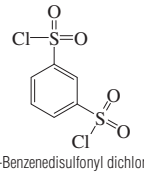

1,4-Benzenedimethanol

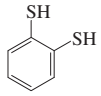

1,2-Benzenediol, diacetate

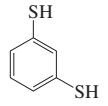

1,4-Benzenediol, diacetate

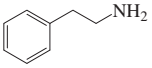

1,3-Benzenediol, monobenzoate

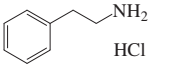

1,3-Benzenedisulfonic acid

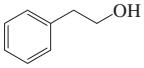

1,3-Benzenedisulfonyl dichloride

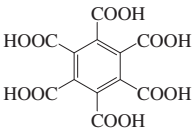

1,2-Benzenedithiol

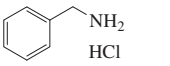

1,3-Benzenedithiol

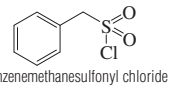

Benzeneethanamine

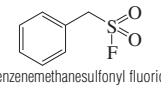

Benzeneethanamine, hydrochloride

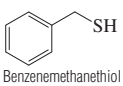

Benzeneethanol

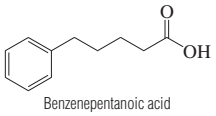

Benzenehexacarboxylic acid


Benzenemethanamine, hydrochloride


Benzenemethanesulfonyl chloride

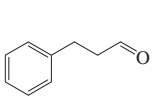

Benzenemethanesulfonyl fluoride

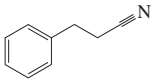

Benzenemethanethiol

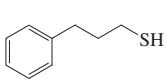

Benzenepentanoic acid

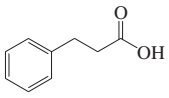
Benzenepentanol

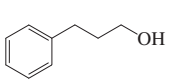
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
650	Benzenepropanal	Hydrocinnamic aldehyde	$C_9H_{10}O$	104-53-0	134.174	mcl	47	224; 117[28]	1.0190[20]		i H_2O; vs EtOH; msc eth
651	Benzenepropanenitrile	Hydrocinnamonitrile	C_9H_9N	645-59-0	131.174	liq	-1	261; 141[25]	1.0016[20]	1.5266[28]	s EtOH, eth; sl chl
652	Benzenepropanethiol		$C_9H_{12}S$	24734-68-7	152.256			121[23], 109[10]	1.01[25]	1.5494[20]	
653	Benzenepropanoic acid	Hydrocinnamic acid	$C_9H_{10}O_2$	501-52-0	150.174	nd (w)	48	279.8	1.0712[49]		s H_2O, EtOH, eth, ctc, CS_2; vs bz
654	Benzenepropanol	Hydrocinnamyl alcohol	$C_9H_{12}O$	122-97-4	136.190		<-18	235	0.995[25]	1.5357[25]	s H_2O, ctc; msc EtOH, eth
655	Benzenepropanol carbamate	Phenprobamate	$C_{10}H_{13}NO_2$	673-31-4	179.216		102				i H_2O; s EtOH, chl
656	Benzenepropanoyl chloride		C_9H_9ClO	645-45-4	168.619			dec 225; 105[10]	1.135[21]		s eth, CS_2
657	Benzeneseleninic acid	Phenylseleninic acid	$C_6H_6O_2Se$	6996-92-5	189.07		124.5		1.93[20]		sl H_2O; i bz; vs alk
658	Benzeneselenol		C_6H_6Se	645-96-5	157.07			183.6; 84[25]	1.4865[15]		i H_2O; s EtOH; vs eth, ctc
659	Benzenesulfinic acid		$C_6H_6O_2S$	618-41-7	142.176	pr (w)	84	dec			sl H_2O; s EtOH, eth, bz; i peth
660	Benzenesulfinyl chloride		C_6H_5ClOS	4972-29-6	160.621	pl (peth)	38	71[1.5]	1.3469[25]	1.3470[25]	s eth, chl
661	Benzenesulfonamide		$C_6H_7NO_2S$	98-10-2	157.191	lf, nd (w)	156				sl H_2O, tfa; s EtOH, eth
662	Benzenesulfonic acid	Besylic acid	$C_6H_6O_3S$	98-11-3	158.175	nd (bz)	65				vs H_2O, EtOH; i eth; sl bz; s HOAc
663	Benzenesulfonyl chloride	Phenylsulfonyl chloride	$C_6H_5ClO_2S$	98-09-9	176.621		14.5	dec 251	1.3470[15]		i H_2O; vs EtOH; s eth, ctc
664	Benzenesulfonyl fluoride	Phenylsulfonyl fluoride	$C_6H_5FO_2S$	368-43-4	160.166			203.5	1.3286[20]	1.4932[18]	s EtOH, eth
665	1,2,4,5-Benzenetetracarboxylic acid	Pyromellitic acid	$C_{10}H_6O_8$	89-05-4	254.150	tcl pr (w+2)	276				sl H_2O; s EtOH
666	Benzenethiol	Phenyl mercaptan	C_6H_6S	108-98-5	110.177	liq	-14.93	169.1	1.0775[20]	1.5893[20]	i H_2O; s EtOH, eth, bz; sl ctc
667	1,3,5-Benzenetricarbonyl trichloride		$C_9H_3Cl_3O_3$	4422-95-1	265.477		36.3	180[16]			s chl
668	1,2,3-Benzenetricarboxylic acid	Hemimellitic acid	$C_9H_6O_6$	569-51-7	210.140	pr (al)	200		1.546[20]		vs eth, EtOH
669	1,2,4-Benzenetricarboxylic acid	Trimellitic acid	$C_9H_6O_6$	528-44-9	210.140	nd (w) cry (al) cry (HOAc)	219				vs H_2O, eth, EtOH
670	1,3,5-Benzenetricarboxylic acid		$C_9H_6O_6$	554-95-0	210.140	pr or nd (w+1)	380				sl H_2O; vs EtOH, eth
671	1,2,4-Benzenetricarboxylic acid 1,2-anhydride, 4-chloride	4-(Chloroformyl)phthalic anhydride	$C_9H_3ClO_4$	1204-28-0	210.571		66				
672	1,2,4-Benzenetricarboxylic acid, triallyl ester		$C_{18}H_{18}O_6$	2694-54-4	330.332		<-30		1.164[20]		
673	1,2,3-Benzenetriol	Pyrogallol	$C_6H_6O_3$	87-66-1	126.110	lf or nd (bz)	133	309	1.453[4]	1.561[134]	vs H_2O, EtOH, eth, NH_3; s ace; i bz
674	1,2,4-Benzenetriol	Hydroxyhydroquinone	$C_6H_6O_3$	533-73-3	126.110	pl (eth), lf or pl (w)	140.5				vs H_2O, EtOH, eth; i bz, chl
675	1,3,5-Benzenetriol	Phloroglucinol	$C_6H_6O_3$	108-73-6	126.110	lf or pl (w +2)	218.5	sub	1.46[25]		sl H_2O; vs EtOH, eth, bz, py; s ace
676	1,2,4-Benzenetriol triacetate		$C_{12}H_{12}O_6$	613-03-6	252.219		99	300			s EtOH, chl, MeOH
677	Benzestrol		$C_{20}H_{26}O_2$	85-95-0	298.419	cry (al)	164				vs ace, eth, EtOH, HOAc
678	Benzethonium chloride		$C_{27}H_{42}ClNO_2$	121-54-0	448.081	pl (chl/eth)	165 (hyd)				vs H_2O; s ace, chl, EtOH
679	Benzidene-3,3'-dicarboxylic acid	3,3'-Dicarboxybenzidine	$C_{14}H_{12}N_2O_4$	2130-56-5	272.256	nd	300 dec				
680	*p*-Benzidine	[1,1'-Biphenyl]-4,4'-diamine	$C_{12}H_{12}N_2$	92-87-5	184.236	nd (w)	120	401			sl H_2O, eth, DMSO; s EtOH
681	Benzil	Diphenylethanedione	$C_{14}H_{10}O_2$	134-81-6	210.228	ye pr (al)	94.87	347	1.084[102]		i H_2O; vs EtOH, eth; s ace; sl ctc
682	1*H*-Benzimidazol-2-amine		$C_7H_7N_3$	934-32-7	133.151	pl (w)	224				s H_2O, EtOH, ace; sl eth, bz, DMSO
683	1*H*-Benzimidazole	*N,N'*-Methenyl-*o*-phenylenediamine	$C_7H_6N_2$	51-17-2	118.136	orth bipym pl (w)	170.5	>360			sl H_2O, eth; vs EtOH; i bz; s dil alk
684	1*H*-Benzimidazole-2-acetonitrile		$C_9H_7N_3$	4414-88-4	157.172		208.4				
685	1*H*-Benz[de]isoquinoline-1,3(2*H*)-dione		$C_{12}H_7NO_2$	81-83-4	197.190	nd (chl-al)	300				
686	Benzo[c]chrysene		$C_{22}H_{14}$	194-69-4	278.346	nd (AcOH)	126.5				
687	Benzo[g]chrysene	Benzo[a]triphenylene	$C_{22}H_{14}$	196-78-1	278.346	nd (AcOH)	114.5				

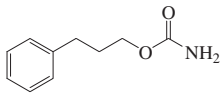

Benzenepropanal

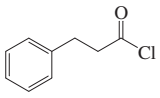

Benzenepropanenitrile

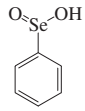

Benzenepropanethiol


Benzenepropanoic acid

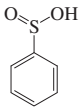

Benzenepropanol

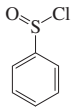

Benzenepropanol carbamate

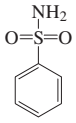

Benzenepropanoyl chloride

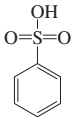

Benzeneseleninic acid

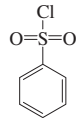

Benzeneselenol

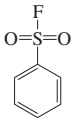

Benzenesulfinic acid

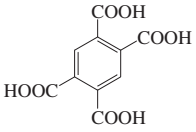

Benzenesulfinyl chloride


Benzenesulfonamide

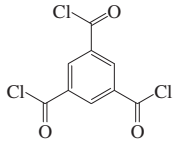

Benzenesulfonic acid

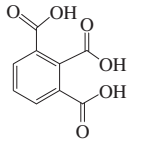

Benzenesulfonyl chloride

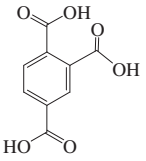

Benzenesulfonyl fluoride

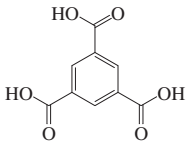

1,2,4,5-Benzenetetracarboxylic acid

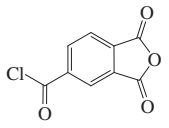

Benzenethiol

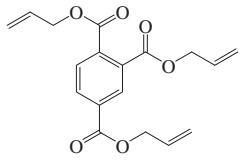

1,3,5-Benzenetricarbonyl trichloride

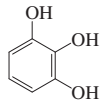

1,2,3-Benzenetricarboxylic acid

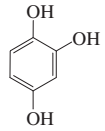

1,2,4-Benzenetricarboxylic acid

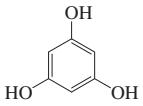

1,3,5-Benzenetricarboxylic acid

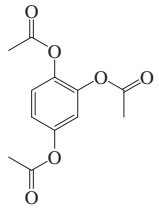

1,2,4-Benzenetricarboxylic acid 1,2-anhydride, 4-chloride

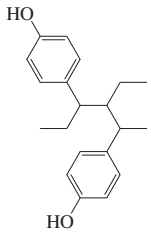

1,2,4-Benzenetricarboxylic acid, triallyl ester

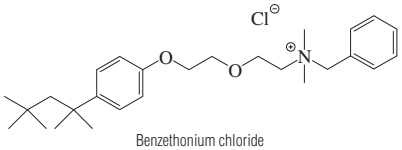

1,2,3-Benzenetriol

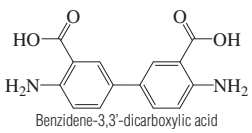

1,2,4-Benzenetriol

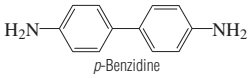

1,3,5-Benzenetriol

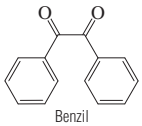

1,2,4-Benzenetriol triacetate

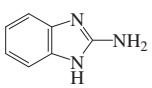

Benzestrol


Benzethonium chloride

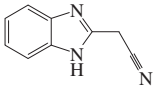

Benzidene-3,3'-dicarboxylic acid

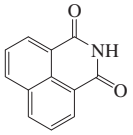

p-Benzidine

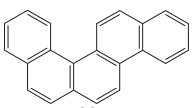

Benzil

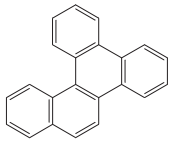

1*H*-Benzimidazol-2-amine


1*H*-Benzimidazole

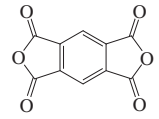

1*H*-Benzimidazole-2-acetonitrile

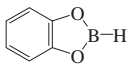

1*H*-Benz[de]isoquinoline-1,3(2*H*)-dione

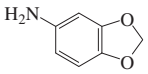

Benzo[c]chrysene


Benzo[g]chrysene

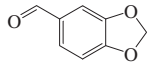
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
688	1*H*,3*H*-Benzo[1,2-c:4,5-c']difuran-1,3,5,7-tetrone		$C_{10}H_2O_6$	89-32-7	218.119		285.3				
689	1,3,2-Benzodioxaborole		$C_6H_5BO_2$	274-07-7	119.914		12	88[156], 50[50]	1.2700[20]	1.5070[20]	
690	1,3-Benzodioxol-5-amine		$C_7H_7NO_2$	14268-66-7	137.137		42	144[16]			
691	1,3-Benzodioxole		$C_7H_6O_2$	274-09-9	122.122			172.5; 77[27]	1.064[25]	1.5398[20]	
692	1,3-Benzodioxole-5-carboxaldehyde	Piperonal	$C_8H_6O_3$	120-57-0	150.132		37	263			sl H_2O; vs EtOH; msc eth; s ace, chl
693	1,3-Benzodioxole-5-carboxylic acid	Piperonylic acid	$C_8H_6O_4$	94-53-1	166.132		229				
694	1,3-Benzodioxole-5-ethanamine		$C_9H_{11}NO_2$	1484-85-1	165.189			166[20], 101[1]	1.225[20]	1.5620[20]	
695	1,3-Benzodioxole-5-methanamine		$C_8H_9NO_2$	2620-50-0	151.163			139[13], 100[0.07]	1.214[25]	1.5635[20]	
696	1,3-Benzodioxole-5-methanol		$C_8H_8O_3$	495-76-1	152.148	nd (peth)	58	157[16]			sl H_2O; s EtOH, eth, bz, chl; i lig
697	1,3-Benzodioxol-5-ol		$C_7H_6O_3$	533-31-3	138.121		64.9				
698	*trans,trans*-5-(1,3-Benzodioxol-5-yl)-2,4-pentadienoic acid	Piperinic acid	$C_{12}H_{10}O_4$	136-72-1	218.205	nd (al), ye nd (sub)	215.8	sub			vs EtOH
699	7,8-Benzoflavone	2-Phenyl-4*H*-naphtho[1,2-b] pyran-4-one	$C_{19}H_{12}O_2$	604-59-1	272.297	ye pl (al)	157				sl EtOH, chl; s sulf
700	Benzo[b]fluoranthene	Benz[e]acephenanthrylene	$C_{20}H_{12}$	205-99-2	252.309	nd (bz)	168				i H_2O; msc bz
701	Benzo[j]fluoranthene	Dibenzo[a,jk]fluorene	$C_{20}H_{12}$	205-82-3	252.309	ye pl (al) nd (HOAc)	166				i H_2O; sl EtOH, HOAc
702	Benzo[k]fluoranthene	2,3,1',8'-Binaphthylene	$C_{20}H_{12}$	207-08-9	252.309	pa ye nd (bz)	217	480			i H_2O; s EtOH, bz, HOAc
703	11*H*-Benzo[a]fluorene		$C_{17}H_{12}$	238-84-6	216.277	pl (ace or HOAc)	189.5	405			i H_2O; sl EtOH; s eth, bz, chl
704	11*H*-Benzo[b]fluorene		$C_{17}H_{12}$	243-17-4	216.277		212	401			i H_2O
705	Benzofuran	Coumarone	C_8H_6O	271-89-6	118.133		<-18	174	1.0913[25]	1.5615[17]	i H_2O; s EtOH, eth
706	2-Benzofurancarboxylic acid	Coumarilic acid	$C_9H_6O_3$	496-41-3	162.142	nd (w)	192.5	312.5			vs EtOH
707	2(3*H*)-Benzofuranone		$C_8H_6O_2$	553-86-6	134.133		50	249	1.2236[14]		
708	3(2*H*)-Benzofuranone		$C_8H_6O_2$	7169-34-8	134.133	red nd (al)	102.5	152[15]			vs bz
709	1-(2-Benzofuranyl)ethanone		$C_{10}H_8O_2$	1646-26-0	160.170		76	126[11]			s H_2O
710	Benzofurazan, 1-oxide		$C_6H_4N_2O_2$	480-96-6	136.108		71.5		1.280[80]		
711	Benzohydrazide	Benzoic acid, hydrazide	$C_7H_8N_2O$	613-94-5	136.151	pl (w)	115	dec 267			s H_2O, EtOH; sl eth, ace, chl
712	Benzoic acid	Benzenecarboxylic acid	$C_7H_6O_2$	65-85-0	122.122	mcl lf or nd	122.35	249.2	1.2659[15]	1.504[132]	sl H_2O; vs EtOH, eth; s ace, bz, chl
713	Benzoic anhydride		$C_{14}H_{10}O_3$	93-97-0	226.227	pr (eth)	42.5	360	1.989[15]	1.5767[15]	i H_2O, lig; s EtOH, eth; sl chl
714	Benzoin	2-Hydroxy-1,2-diphenylethanone, (±)	$C_{14}H_{12}O_2$	579-44-2	212.244		137	344; 194[12]	1.310[20]		vs EtOH, chl
715	Benzonitrile	Phenyl cyanide	C_7H_5N	100-47-0	103.122	liq	-13.99	191.1	1.0093[15]	1.5289[20]	sl H_2O; msc EtOH; vs ace, bz; s ctc
716	Benzo[ghi]perylene	1,12-Benzperylene	$C_{22}H_{12}$	191-24-2	276.330	ye-grn lf (bz)	272.5				i H_2O
717	Benzo[c]phenanthrene	Tetrahelicene	$C_{18}H_{12}$	195-19-7	228.288		68				i H_2O; sl EtOH, lig
718	Benzophenone	Diphenyl ketone	$C_{13}H_{10}O$	119-61-9	182.217	(α) orth pr (al); (β) mcl pr	47.9 (α); 26 (β)	305.4	1.111[18]	1.6077[19]	i H_2O; vs EtOH, eth, chl, ace; s bz
719	Benzophenone hydrazone		$C_{13}H_{12}N_2$	5350-57-2	196.247		97.3	227[55]			
720	Benzophenone, oxime	Diphenyl ketoxime	$C_{13}H_{11}NO$	574-66-3	197.232	nd (al)	144				i H_2O; vs EtOH, eth, chl, ace; s bz
721	3,3',4,4'-Benzophenonetetracarboxylic acid dianhydride	4,4'-Carbonyldiphthalic anhydride	$C_{17}H_6O_7$	2421-28-5	322.226		216				
722	Benzo-2-phenylhydrazide		$C_{13}H_{12}N_2O$	532-96-7	212.246	pr (al), nd (w)	168	314			sl H_2O, eth; s EtOH, bz, chl
723	Benzopurpurine 4B	C.I. Direct Red 2, disodium salt	$C_{34}H_{26}N_6Na_2O_6S_2$	992-59-6	724.716	br pow					s H_2O, EtOH, ac, H_2SO_4
724	2*H*-1-Benzopyran	1,2-Chromene	C_9H_8O	254-04-6	132.159			132[102], 91[13]	1.0993[16]	1.5869[24]	i H_2O
725	[2]Benzopyrano[6,5,4-def][2] benzopyran-1,3,6,8-tetrone	1,4,5,8-Naphthalenetetracarboxylic acid anhydride	$C_{14}H_4O_6$	81-30-1	268.178	nd (al)	450	sub 320			i H_2O; s Na_2CO_3, HOAc
726	1*H*-2-Benzopyran-1-one	Isocoumarin	$C_9H_6O_2$	491-31-6	146.143	pl (bz)	47	286			i H_2O; vs EtOH, eth, bz, CS_2
727	2*H*-1-Benzopyran-2-one	Coumarin	$C_9H_6O_2$	91-64-5	146.143	orth pym (eth)	71	301.7	0.935[20]		s H_2O, EtOH, alk; vs eth, chl, py

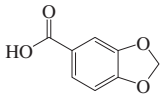

1*H*,3*H*-Benzo[1,2-c:4,5-c']difuran-1,3,5,7-tetrone

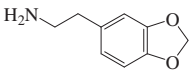

1,3,2-Benzodioxaborole

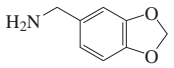

1,3-Benzodioxol-5-amine

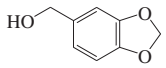

1,3-Benzodioxole

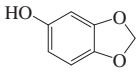

1,3-Benzodioxole-5-carboxaldehyde

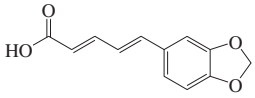

1,3-Benzodioxole-5-carboxylic acid

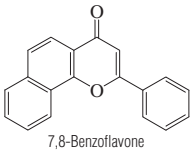

1,3-Benzodioxole-5-ethanamine

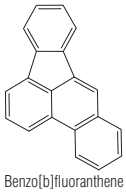

1,3-Benzodioxole-5-methanamine

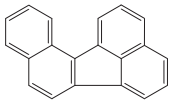

1,3-Benzodioxole-5-methanol

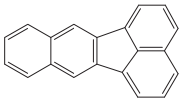

1,3-Benzodioxol-5-ol

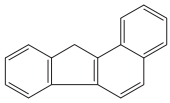

trans,trans-5-(1,3-Benzodioxol-5-yl)-2,4-pentadienoic acid

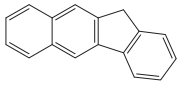

7,8-Benzoflavone


Benzo[b]fluoranthene

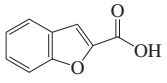

Benzo[j]fluoranthene

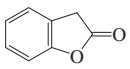

Benzo[k]fluoranthene


11*H*-Benzo[a]fluorene

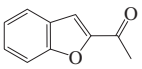

11*H*-Benzo[b]fluorene

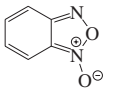

Benzofuran

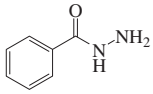

2-Benzofurancarboxylic acid

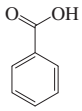

2(3*H*)-Benzofuranone

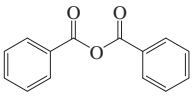

3(2*H*)-Benzofuranone

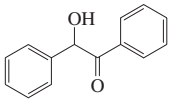

1-(2-Benzofuranyl)ethanone

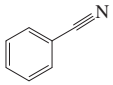

Benzofurazan, 1-oxide

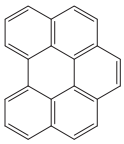

Benzohydrazide

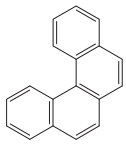

Benzoic acid

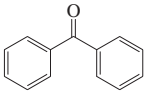

Benzoic anhydride

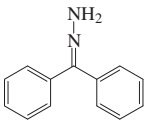

Benzoin

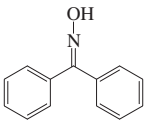

Benzonitrile

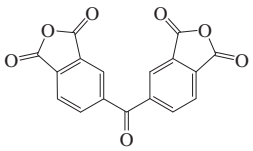

Benzo[ghi]perylene

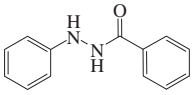

Benzo[c]phenanthrene

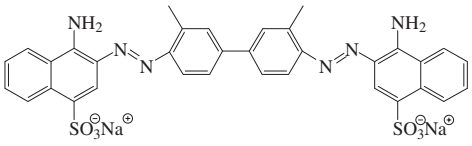

Benzophenone

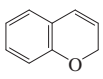

Benzophenone hydrazone

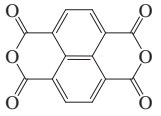

Benzophenone, oxime

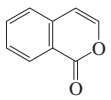

3,3',4,4'-Benzophenonetetracarboxylic acid dianhydride

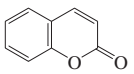

Benzo-2-phenylhydrazide


Benzopurpurine 4B

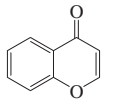

2*H*-1-Benzopyran

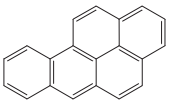

[2]Benzopyrano[6,5,4-def][2]benzopyran-1,3,6,8-tetrone

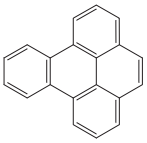

1*H*-2-Benzopyran-1-one

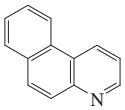

2*H*-1-Benzopyran-2-one

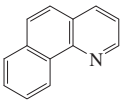
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
728	4*H*-1-Benzopyran-4-one		$C_9H_6O_2$	491-38-3	146.143	nd (peth w)	59	sub	1.2900^{20}		sl H_2O; s EtOH, eth, bz, chl
729	Benzo[a]pyrene	2,3-Benzopyrene	$C_{20}H_{12}$	50-32-8	252.309		181.1				i H_2O; vs chl
730	Benzo[e]pyrene	1,2-Benzpyrene	$C_{20}H_{12}$	192-97-2	252.309	pa ye nd (bz-MeOH)	181.4	311			i H_2O
731	Benzo[f]quinoline	β-Naphthoquinoline	$C_{13}H_9N$	85-02-9	179.217	lf (peth or w)	94	352; 203^{8}			sl H_2O; vs EtOH, bz, eth; s ace
732	Benzo[h]quinoline		$C_{13}H_9N$	230-27-3	179.217	lf (eth), pl (peth)	52	339; 233^{47}	1.2340^{20}		sl H_2O; s EtOH, eth, ace, bz, ctc
733	*p*-Benzoquinone	2,5-Cyclohexadiene-1,4-dione	$C_6H_4O_2$	106-51-4	108.095	ye mcl pr (w)	115	sub	1.318^{20}		sl H_2O, peth; s EtOH, eth, chl
734	2,1,3-Benzothiadiazole		$C_6H_4N_2S$	273-13-2	136.174		43	206			
735	2-Benzothiazolamine	2-Aminobenzothiazole	$C_7H_6N_2S$	136-95-8	150.201	pl (w), lf (w)	132				sl H_2O; s EtOH, eth, chl, con HCl
736	6-Benzothiazolamine	6-Aminobenzothiazole	$C_7H_6N_2S$	533-30-2	150.201	pr (w)	87				i H_2O, eth; s EtOH
737	Benzothiazole	Benzosulfonazole	C_7H_5NS	95-16-9	135.187		1.0	231	1.2460^{20}	1.6379^{20}	sl H_2O; vs EtOH, eth, CS_2; s ace
738	2(3*H*)-Benzothiazolethione	2-Mercaptobenzothiazole	$C_7H_5NS_2$	149-30-4	167.252	pa ye mcl nd(al, MeOH)	181		1.42^{20}		i H_2O; s EtOH; sl eth, bz, DMSO
739	2(3*H*)-Benzothiazolethione, sodium salt		$C_7H_4NNaS_2$	2492-26-4	189.234						sl H_2O
740	2(3*H*)-Benzothiazolone		C_7H_5NOS	934-34-9	151.186	pr (dil al), nd	139	360			i H_2O; vs EtOH, eth
741	2(3*H*)-Benzothiazolone, hydrazone		$C_7H_7N_3S$	615-21-4	165.216		202.8				
742	2-(2-Benzothiazolyl)phenol		$C_{13}H_9NOS$	3411-95-8	227.281	nd or lf (al)	131	179^{3}			s EtOH
743	Benzo[b]thiophene	Thianaphthene	C_8H_6S	95-15-8	134.199	lf	32	221	1.1484^{32}	1.6374^{37}	i H_2O; vs EtOH; s eth, ace, bz; sl chl
744	Benzo[b]thiophene-2-carboxylic acid	Thionaphthene-2-carboxylic acid	$C_9H_6O_2S$	6314-28-9	178.208	nd (w)	240.5				vs eth
745	1*H*-Benzotriazole	1,2,3-Triaza-1*H*-indene	$C_6H_5N_3$	95-14-7	119.124	nd (chl or bz)	100	204^{15}			sl H_2O; s EtOH, bz, chl, tol, DMF
746	Benzo[b]triphenylene		$C_{22}H_{14}$	215-58-7	278.346	nd (al, HOAc)	205				i H_2O; vs bz
747	3*H*-2,1-Benzoxathiol-3-one 1,1-dioxide		$C_7H_4O_4S$	81-08-3	184.170	nd or pr (bz)	129.5	184^{18}			vs bz, chl
748	2*H*-3,1-Benzoxazine-2,4(1*H*)-dione		$C_8H_5NO_3$	118-48-9	163.131	pr (al, gl HOAc) cry (al)	243 dec				sl H_2O, EtOH, ace; i eth, bz, chl
749	Benzoxazole	1-Oxa-3-azaindene	C_7H_5NO	273-53-0	119.121	pr (dil al)	31	182.5	1.1754^{20}	1.5594^{20}	i H_2O; s EtOH, sulf
750	2(3*H*)-Benzoxazolethione		C_7H_5NOS	2382-96-9	151.186	nd (w)	196				sl H_2O, ace, EtOH; vs eth, HOAc
751	2(3*H*)-Benzoxazolone		$C_7H_5NO_2$	59-49-4	135.121		138	335; 230^{30}			sl H_2O; s EtOH, eth, tfa
752	2-(2-Benzoxazolyl)phenol		$C_{13}H_9NO_2$	835-64-3	211.216	pink nd (al, HOAc)	123.5	338			sl H_2O; vs EtOH; s eth, ace, bz
753	*N*-Benzoyl-*DL*-alanine		$C_{10}H_{11}NO_3$	1205-02-3	193.199	pl, pr or lf (eth)	165.5	dec			s H_2O, EtOH; sl eth, DMSO
754	4-(Benzoylamino)-2-hydroxybenzoic acid	Benzoylpas	$C_{14}H_{11}NO_4$	13898-58-3	257.242		260.5				
755	Benzoyl azide	Benzazide	$C_7H_5N_3O$	582-61-6	147.134	pl (ace)	32	exp	1.1680^{35}		vs eth, EtOH
756	2-Benzoylbenzoic acid		$C_{14}H_{10}O_3$	85-52-9	226.227	tcl nd (w+1)	129.0				vs EtOH, eth; s bz; sl chl
757	4-Benzoylbenzoic acid		$C_{14}H_{10}O_3$	611-95-0	226.227	nd (HOAc), pl (al) mcl lf (w)	199	sub			sl H_2O, tfa, bz; s EtOH, eth, HOAc
758	2-Benzoylbenzoic acid, hydrazide		$C_{14}H_{12}N_2O_2$	787-84-8	240.257	nd (al)	242.3				sl H_2O; i EtOH, eth, chl; s MeOH
759	4-Benzoylbiphenyl	4-Phenylbenzophenone	$C_{19}H_{14}O$	2128-93-0	258.313		101.5	420; 156$^{0.1}$			
760	Benzoyl bromide	Benzoic acid, bromide	C_7H_5BrO	618-32-6	185.018	liq	-24	218.5	1.570^{15}	1.5868^{25}	msc eth
761	Benzoyl chloride	Benzoic acid, chloride	C_7H_5ClO	98-88-4	140.567	liq	-0.4	197.2; 71^{9}	1.2120^{20}	1.5537^{20}	msc eth; s bz, ctc, CS_2
762	Benzoyl cyclohexane	Cyclohexyl phenyl ketone	$C_{13}H_{16}O$	712-50-5	188.265	nd (peth)	59.5	164^{18}			
763	Benzoylecgonine		$C_{16}H_{19}NO_4$	519-09-5	289.327	nd (w)	195				vs bz, EtOH
764	Benzoylferrocene		$C_{17}H_{14}FeO$	1272-44-2	290.137		110.0				
765	Benzoyl fluoride	Benzoic acid, fluoride	C_7H_5FO	455-32-3	124.112	liq	-28	154.5	1.1400^{20}		vs EtOH, eth; s ctc

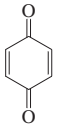

4*H*-1-Benzopyran-4-one

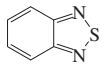

Benzo[a]pyrene

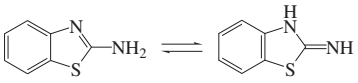

Benzo[e]pyrene

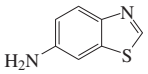

Benzo[f]quinoline


Benzo[h]quinoline

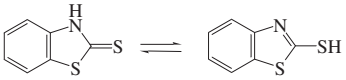

p-Benzoquinone

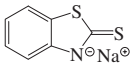

2,1,3-Benzothiadiazole

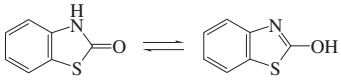

2-Benzothiazolamine

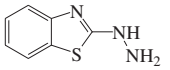

6-Benzothiazolamine

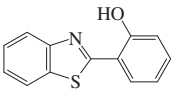

Benzothiazole


2(3*H*)-Benzothiazolethione

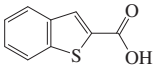

2(3*H*)-Benzothiazolethione, sodium salt

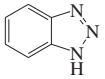

2(3*H*)-Benzothiazolone

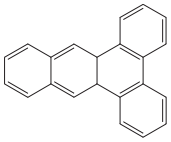

2(3*H*)-Benzothiazolone, hydrazone

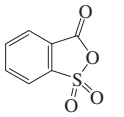

2-(2-Benzothiazolyl)phenol

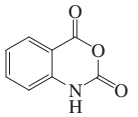

Benzo[b]thiophene


Benzo[b]thiophene-2-carboxylic acid


1*H*-Benzotriazole

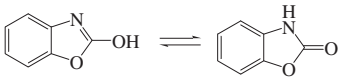

Benzo[b]triphenylene

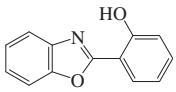

3*H*-2,1-Benzoxathiol-3-one 1,1-dioxide

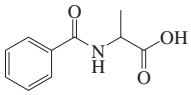

2*H*-3,1-Benzoxazine-2,4(1*H*)-dione

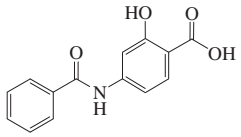

Benzoxazole

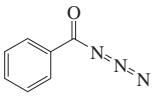

2(3*H*)-Benzoxazolethione

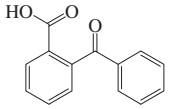

2(3*H*)-Benzoxazolone

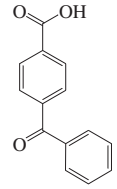

2-(2-Benzoxazolyl)phenol

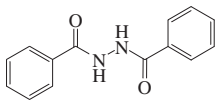

N-Benzoyl-*DL*-alanine

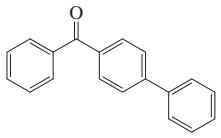

4-(Benzoylamino)-2-hydroxybenzoic acid

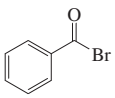

Benzoyl azide

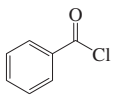

2-Benzoylbenzoic acid

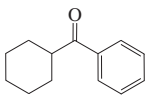

4-Benzoylbenzoic acid

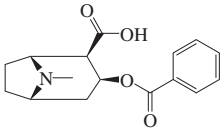

2-Benzoylbenzoic acid, hydrazide

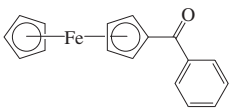

4-Benzoylbiphenyl

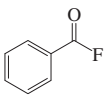

Benzoyl bromide


Benzoyl chloride

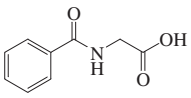

Benzoyl cyclohexane

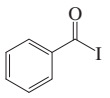

Benzoylecgonine

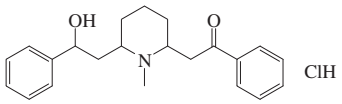

Benzoylferrocene

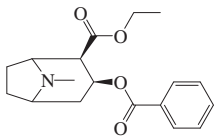

Benzoyl fluoride

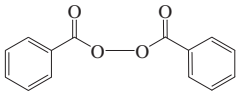
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
766	*N*-Benzoylglycine	Hippuric acid	$C_9H_9NO_3$	495-69-2	179.172	pr (w or al)	191.5		1.371^{20}		s H_2O, EtOH; sl eth, bz, chl; i peth
767	Benzoyl iodide	Benzoic acid, iodide	C_7H_5IO	618-38-2	232.018	nd	1.5	128^{20}	1.746^{18}		vs eth, EtOH
768	2-Benzoylmethyl-6(2-hydroxy-2-phenylethyl)-1-methylpiperidine, hydrochloride		$C_{22}H_{28}ClNO_2$	63990-84-1	373.916		183.5				sl H_2O; s EtOH; vs chl
769	3-(Benzoyloxy)-8-methyl-8-azabicyclo[3.2.1]octane-2-carboxylic acid, ethyl ester, [1*R*-(*exo*,*exo*)]	Cocaethylene	$C_{18}H_{23}NO_4$	529-38-4	317.381	pr (eth)	109				vs eth, EtOH
770	Benzoyl peroxide		$C_{14}H_{10}O_4$	94-36-0	242.227	orth (eth), pr	105	exp		1.543	sl H_2O; s EtOH, eth, ace, bz, CS_2
771	1-Benzoylpiperidine		$C_{12}H_{15}NO$	776-75-0	189.253	tcl	49	320.5			i H_2O; s EtOH, eth; sl ctc
772	*N*-Benzoyl-*L*-tyrosine ethyl ester		$C_{18}H_{19}NO_4$	3483-82-7	313.349		119.5				
773	Benzphetamine		$C_{17}H_{21}N$	156-08-1	239.356			$127^{0.02}$		1.5515^{19}	vs eth, EtOH, MeOH, chl
774	Benzpiperylon		$C_{22}H_{25}N_3O$	53-89-4	347.453	cry (al)	182 dec				
775	Benzquinamide		$C_{22}H_{32}N_2O_5$	63-12-7	404.499	cry	131				
776	Benzthiazide		$C_{15}H_{14}ClN_3O_4S_3$	91-33-8	431.938	cry (EtOH)	236				i H_2O; s alk
777	*N*-Benzylacetamide		$C_9H_{11}NO$	588-46-5	149.189		61	157^{2}			vs EtOH, eth
778	Benzyl acetate		$C_9H_{10}O_2$	140-11-4	150.174	liq	-51.3	213	1.0550^{20}	1.5232^{20}	sl H_2O; msc EtOH; s eth, ace, chl
779	Benzyl acrylate		$C_{10}H_{10}O_2$	2495-35-4	162.185			228	1.0573^{20}	1.5143^{20}	i H_2O; s EtOH, eth, ace, ctc
780	Benzyl alcohol	Benzenemethanol	C_7H_8O	100-51-6	108.138	liq	-15.4	205.31	1.0419^{24}	1.5396^{20}	s H_2O, EtOH, eth, ace, bz, MeOH, chl
781	Benzylamine	Benzenemethanamine	C_7H_9N	100-46-9	107.153			$185; 90^{12}$	0.9813^{20}	1.5401^{20}	msc H_2O, EtOH, eth; vs ace; s bz; sl chl
782	4-(Benzylamino) benzenesulfonamide	*N*4-Benzylsulfanilamide	$C_{13}H_{14}N_2O_2S$	104-22-3	262.327		171				
783	2-[Benzylamino]ethanol		$C_9H_{13}NO$	104-63-2	151.205			$225; 154^{12}$	1.065^{25}	1.5430^{20}	
784	4-Benzylaniline		$C_{13}H_{13}N$	1135-12-2	183.249	mcl (lig)	34.5	300	1.038^{25}		vs eth, EtOH, lig
785	*N*-Benzylaniline	*N*-Phenylbenzenemethanamine	$C_{13}H_{13}N$	103-32-2	183.249	pr	37.5	306.5	1.0298^{65}	1.6118^{25}	vs eth, EtOH
786	α-Benzylbenzenepropanoic acid		$C_{16}H_{16}O_2$	618-68-8	240.297	pl (peth HOAc) nd (w)	90	235^{18}			vs bz, eth, EtOH
787	2-Benzyl-1*H*-benzimidazole	Bendazol	$C_{14}H_{12}N_2$	621-72-7	208.258	nd (bz)	187				vs bz, EtOH, gl HOAc
788	Benzyl benzoate		$C_{14}H_{12}O_2$	120-51-4	212.244	nd or lf	21	323.5	1.1121^{25}	1.5680^{20}	i H_2O; s EtOH, eth, ace, bz, MeOH, chl
789	4-Benzyl-1,1'-biphenyl		$C_{19}H_{16}$	613-42-3	244.330	lf	85	285^{110}	1.171^{0}		i H_2O; s EtOH, ctc; vs eth, bz
790	Benzyl butanoate		$C_{11}H_{14}O_2$	103-37-7	178.228			239	1.0111^{20}	1.4920^{20}	i H_2O; vs EtOH, eth; s ctc
791	Benzyl butyl phthalate	Butyl benzyl phthalate	$C_{19}H_{20}O_4$	85-68-7	312.360	liq		370	1.119^{25}		i H_2O
792	Benzyl chloroacetate		$C_9H_9ClO_2$	140-18-1	184.619			$147^{9}, 85^{0.4}$	1.2223^{4}	1.5426^{18}	vs eth, EtOH
793	Benzyl chloroformate	Carbobenzoxy chloride	$C_8H_7ClO_2$	501-53-1	170.594	oily liq		103^{20}	1.195^{25}	1.5190^{20}	s eth, ace, bz
794	Benzyl *trans*-cinnamate	Benzyl *trans*-3-phenyl-2-propenoate	$C_{16}H_{14}O_2$	78277-23-3	238.281	pr	39	dec 350; 244^{5}	1.109^{15}		i H_2O; s EtOH, eth; sl bz
795	Benzyl dodecanoate	Benzyl laurate	$C_{19}H_{30}O_2$	140-25-0	290.440		8.5	210^{12}	0.9429^{25}	1.4812^{24}	vs bz, eth, EtOH, peth
796	Benzylethylamine	*N*-Ethylbenzenemethanamine	$C_9H_{13}N$	14321-27-8	135.206			194	0.9342^{17}	1.5117^{20}	sl H_2O, ctc; s EtOH, eth, bz, chl
797	*N*-Benzyl-*N*-ethylaniline	Ethylbenzylaniline	$C_{15}H_{17}N$	92-59-1	211.303	pa ye oil	35	$288; 185^{22}$	1.001^{55}	1.5943^{23}	i H_2O; s EtOH, eth, chl
798	Benzyl ethyl ether		$C_9H_{12}O$	539-30-0	136.190			186	0.9478^{20}	1.4955^{20}	i H_2O; msc EtOH, eth
799	Benzyl formate		$C_8H_8O_2$	104-57-4	136.149			$203; 84^{10}$	1.081^{20}	1.5154^{20}	i H_2O; s EtOH, ace; msc eth; sl ctc
800	Benzyl fumarate		$C_{18}H_{16}O_4$	538-64-7	296.318	cry pow	59	210^{5}			vs eth, EtOH, chl
801	Benzylidene diacetate	Toluene-α,α-diol, diacetate	$C_{11}H_{12}O_4$	581-55-5	208.211	pl (eth)	46	220	1.11^{20}		vs bz, eth, EtOH
802	Benzylimidobis(*p*-methoxyphenyl) methane		$C_{22}H_{21}NO_2$	524-96-9	331.408	pa ye cry	90				vs eth, chl
803	2-Benzyl-1*H*-isoindole-1,3(2*H*)-dione		$C_{15}H_{11}NO_2$	2142-01-0	237.254	ye nd (al)	116		1.343^{18}		s EtOH, HOAc; sl DMSO

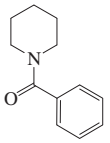

N-Benzoylglycine

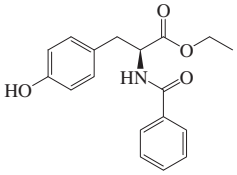

Benzoyl iodide

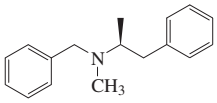

2-Benzoylmethyl-6(2-hydroxy-2-phenylethyl)-1-methylpiperidine, hydrochloride

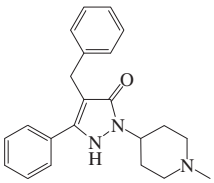

3-(Benzoyloxy)-8-methyl-8-azabicyclo[3.2.1]octane-2-carboxylic acid, ethyl ester, [1*R*-(*exo*,*exo*)]

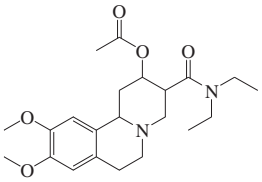

Benzoyl peroxide

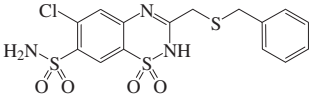

1-Benzoylpiperidine

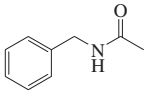

N-Benzoyl-*L*-tyrosine ethyl ester

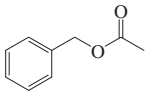

Benzphetamine

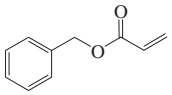

Benzpiperylon

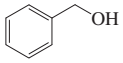

Benzquinamide

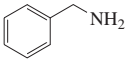

Benzthiazide

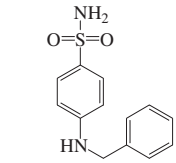

N-Benzylacetamide

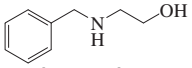

Benzyl acetate

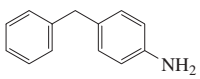

Benzyl acrylate

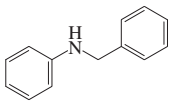

Benzyl alcohol

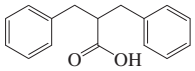

Benzylamine

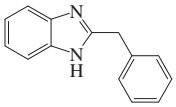

4-(Benzylamino)benzenesulfonamide

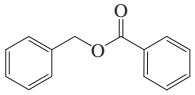

2-[Benzylamino]ethanol

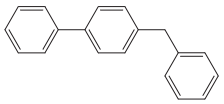

4-Benzylaniline

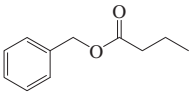

N-Benzylaniline

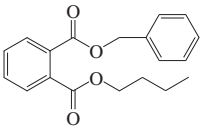

α-Benzylbenzenepropanoic acid

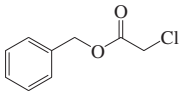

2-Benzyl-1*H*-benzimidazole

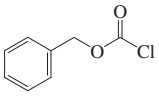

Benzyl benzoate

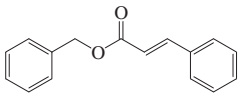

4-Benzyl-1,1'-biphenyl

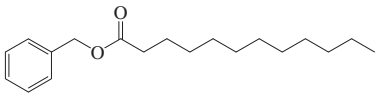

Benzyl butanoate

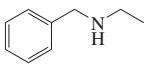

Benzyl butyl phthalate

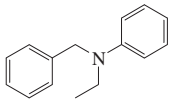

Benzyl chloroacetate

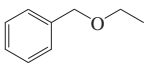

Benzyl chloroformate

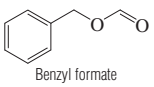

Benzyl *trans*-cinnamate

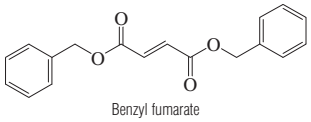

Benzyl dodecanoate

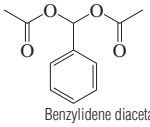

Benzylethylamine

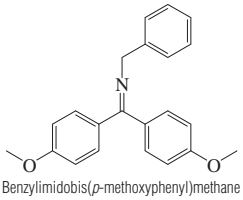

N-Benzyl-*N*-ethylaniline

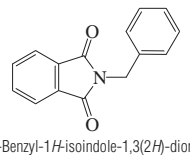

Benzyl ethyl ether


Benzyl formate

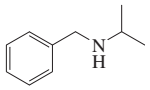

Benzyl fumarate

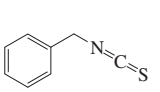

Benzylidene diacetate

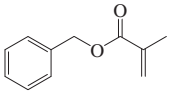

Benzylimidobis(*p*-methoxyphenyl)methane

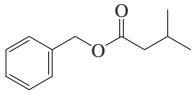

2-Benzyl-1*H*-isoindole-1,3(2*H*)-dione

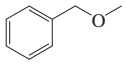
No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
804	Benzylisopropylamine	*N*-Isopropylbenzenemethanamine	$C_{10}H_{15}N$	102-97-6	149.233			200; 93^{10}	0.892^{25}	1.5025^{20}	
805	Benzyl isothiocyanate	(Isothiocyanatomethyl)benzene	C_8H_7NS	622-78-6	149.214	ye oil		243	1.1246^{16}	1.6049^{15}	i H_2O; msc EtOH; s eth
806	Benzyl methacrylate		$C_{11}H_{12}O_2$	2495-37-6	176.212			144^{50}			
807	Benzyl 3-methylbutanoate		$C_{12}H_{16}O_2$	103-38-8	192.254			245; 136^{25}	0.9983^{15}	1.4884^{20}	
808	Benzyl methyl ether		$C_8H_{10}O$	538-86-3	122.164	liq	-52.6	170	0.9634^{20}	1.5008^{20}	i H_2O, lig; vs EtOH, eth; s bz
809	1-Benzyl-2-methylhydrazine	1-Methyl-2-phenylmethylhydrazine	$C_8H_{12}N_2$	10309-79-2	136.194	liq		117^{20}			
810	Benzyl 2-methylpropanoate	Benzyl isobutyrate	$C_{11}H_{14}O_2$	103-28-6	178.228			228; 114^{20}	1.0159^{18}	1.4883^{20}	
811	Benzyl nitrite		$C_7H_7NO_2$	935-05-7	137.137	oil		81^{35}	1.075^{25}	1.4989^{25}	
812	*N*-Benzyloxycarbonylaspartame		$C_{22}H_{24}N_2O_7$	33605-72-0	428.435	cry	122				
813	Benzyloxycarbonyl-*L*-glutamine		$C_{13}H_{16}N_2O_5$	2650-64-8	280.276		134.5				s DMSO
814	Benzyloxycarbonylglycine		$C_{10}H_{11}NO_4$	1138-80-3	209.199		121				s ace
815	Benzyloxycarbonylglycyl-*L*-leucine		$C_{16}H_{22}N_2O_5$	1421-69-8	322.356		100				
816	Benzyloxycarbonylglycyl-*L*-phenylalanine		$C_{19}H_{20}N_2O_5$	1170-76-9	356.372		126				
817	2-(Benzyloxy)ethanol	Ethylene glycol monobenzyl ether	$C_9H_{12}O_2$	622-08-2	152.190	oil	<-75	256	1.0640^{20}	1.5233^{20}	vs H_2O, eth, EtOH
818	Benzylpenicillin sodium		$C_{16}H_{17}N_2NaO_4S$	69-57-8	356.372	nd (BuOH aq)	215		1.41		vs H_2O; s MeOH; i ace, eth, chl
819	2-Benzylphenol	*o*-Benzylphenol	$C_{13}H_{12}O$	28994-41-4	184.233		21	312		1.5994^{20}	vs ace, bz, EtOH
820	4-Benzylphenol	*p*-Benzylphenol	$C_{13}H_{12}O$	101-53-1	184.233		84	322			s H_2O, EtOH, eth, bz, ctc, HOAc, chl
821	Benzyl phenyl ether		$C_{13}H_{12}O$	946-80-5	184.233	lf (al)	40	286.5			
822	1-Benzylpiperazine		$C_{11}H_{16}N_2$	2759-28-6	176.258			146^{12}		1.5430^{28}	s H_2O, EtOH, eth; sl chl
823	1-Benzylpiperidine		$C_{12}H_{17}N$	2905-56-8	175.270			245	0.9625^{16}	1.5227^{20}	
824	4-Benzylpiperidine		$C_{12}H_{17}N$	31252-42-3	175.270		16.8	270; 150^{17}	0.9970^{20}	1.5337^{25}	i H_2O; s EtOH, eth
825	Benzyl propanoate		$C_{10}H_{12}O_2$	122-63-4	164.201			221	1.0335^{20}		
826	2-Benzylpyridine		$C_{12}H_{11}N$	101-82-6	169.222	nd	12.5	277; 149^{16}	1.067^{0}	1.5785^{20}	i H_2O; s EtOH, eth, chl
827	4-Benzylpyridine		$C_{12}H_{11}N$	2116-65-6	169.222		12.4	288; 180^{31}	1.0612^{20}	1.5818^{20}	i H_2O; s EtOH, ctc; vs eth
828	Benzyl 3-pyridinecarboxylate	Benzyl nicotinate	$C_{13}H_{11}NO_2$	94-44-0	213.232			170^{3}			
829	1-Benzyl-1*H*-pyrrole		$C_{11}H_{11}N$	2051-97-0	157.212		15	247	1.0183^{20}	1.5655^{24}	i H_2O; vs EtOH, eth
830	Benzyl 1,2-pyrrolidinedicarboxylate, (*S*)	*N*-(Benzyloxycarbonyl)-*L*-proline	$C_{13}H_{15}NO_4$	1148-11-4	249.263		78.5			1.5310^{20}	sl chl
831	Benzyl salicylate		$C_{14}H_{12}O_3$	118-58-1	228.243			320	1.1799^{20}	1.5805^{20}	sl H_2O; s EtOH, eth, ctc
832	*O*-Benzyl-*L*-serine	3-(Benzyloxy)-*L*-alanine	$C_{10}H_{13}NO_3$	4726-96-9	195.215		218 dec				
833	Benzylsulfonic acid		$C_7H_8O_3S$	100-87-8	172.202	hyg cry					
834	4-[(Benzylsulfonyl)amino]benzoic acid	*p*-(Benzylsulfonamido)benzoic acid	$C_{14}H_{13}NO_4S$	536-95-8	291.323		229.5				vs EtOH
835	(Benzylsulfonyl)benzene		$C_{13}H_{12}O_2S$	3112-88-7	232.298	nd (al)	146		1.1261^{153}		i H_2O; sl EtOH, eth, bz
836	(Benzylthio)benzene		$C_{13}H_{12}S$	831-91-4	200.299	lf (al)	43.5	197^{27}			i H_2O; s EtOH, eth, con sulf
837	Benzyl thiocyanate	α-Thiocyanatotoluene	C_8H_7NS	3012-37-1	149.214	pr (al)	43	232			i H_2O; s EtOH, eth, chl, CS_2
838	Benzyltrimethylammonium chloride		$C_{10}H_{16}ClN$	56-93-9	185.694		243				vs H_2O; s ace
839	Benzylurea		$C_8H_{10}N_2O$	538-32-9	150.177	nd (al)	148	dec 200			vs ace, EtOH
840	Bephenium chloride		$C_{17}H_{22}ClNO$	13928-81-9	291.816	cry (ace)	135				
841	Berberine		$C_{20}H_{19}NO_5$	2086-83-1	353.369	red-ye nd (w+6) cry (chl)	145				vs eth, EtOH
842	Berberine chloride dihydrate		$C_{20}H_{22}ClNO_6$	633-65-8	407.845	ye cry					
843	Bergenin		$C_{14}H_{16}O_9$	477-90-7	328.272	cry (MeOH)	238				vs H_2O, EtOH
844	Beryllium 2,4-pentanedioate	Beryllium acetylacetonate	$C_{10}H_{14}BeO_4$	10210-64-7	207.228		108	270	1.168^{20}		
845	Betaine	1-Carboxy-*N,N,N*-trimethylmethanaminium, inner salt	$C_5H_{11}NO_2$	107-43-7	117.147	pr or lf (al)	293 dec				vs H_2O, MeOH; s EtOH; sl eth, chl
846	Betaine, hydrochloride		$C_5H_{12}ClNO_2$	590-46-5	153.608	mcl cry (al)	227.5				vs H_2O
847	Betamethasone		$C_{22}H_{29}FO_5$	378-44-9	392.460	cry (AcOMe)	232 dec				
848	Bethanidine		$C_{10}H_{15}N_3$	55-73-2	177.246	cry (aq MeOH)	196				

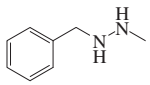

Benzylisopropylamine

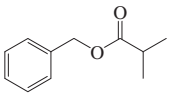

Benzyl isothiocyanate

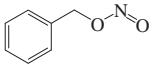

Benzyl methacryalate

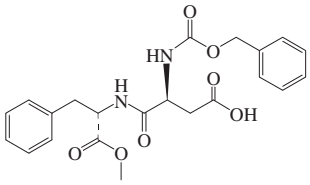

Benzyl 3-methylbutanoate

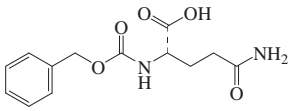

Benzyl methyl ether

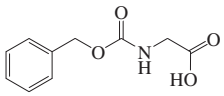

1-Benzyl-2-methylhydrazine

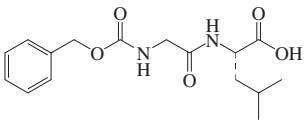

Benzyl 2-methylpropanoate

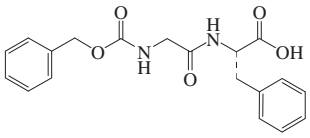

Benzyl nitrite

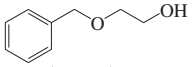

N-Benzyloxycarbonylaspartame

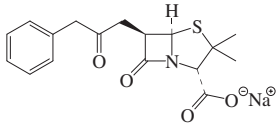

Benzyloxycarbonyl-*L*-glutamine

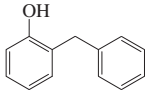

Benzyloxycarbonylglycine

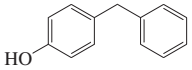

Benzyloxycarbonylglycyl-*L*-leucine

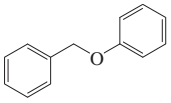

Benzyloxycarbonylglycyl-*L*-phenylalanine

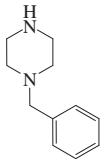

2-(Benzyloxy)ethanol

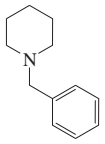

Benzylpenicillin sodium

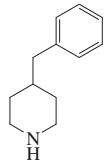

2-Benzylphenol

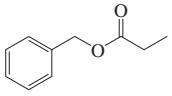

4-Benzylphenol

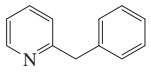

Benzyl phenyl ether

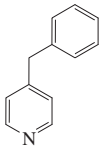

1-Benzylpiperazine

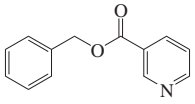

1-Benzylpiperidine

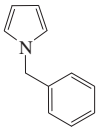

4-Benzylpiperidine

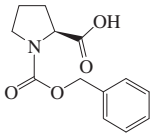

Benzyl propanoate

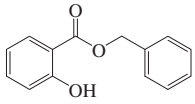

2-Benzylpyridine

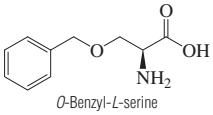

4-Benzylpyridine

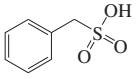

Benzyl 3-pyridinecarboxylate

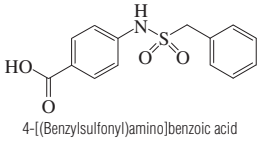

1-Benzyl-1*H*-pyrrole

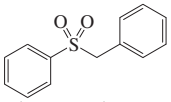

Benzyl 1,2-pyrrolidinedicarboxylate, (*S*)

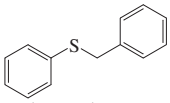

Benzyl salicylate

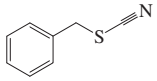

O-Benzyl-*L*-serine

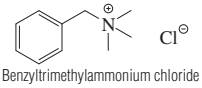

Benzylsulfonic acid

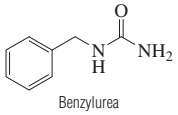

4-[(Benzylsulfonyl)amino]benzoic acid

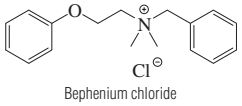

(Benzylsulfonyl)benzene

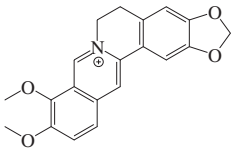

(Benzylthio)benzene

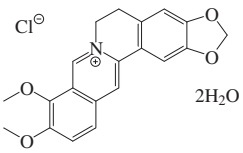

Benzyl thiocyanate

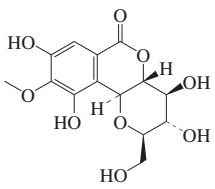

Benzyltrimethylammonium chloride


Benzylurea


Bephenium chloride


Berberine


Berberine chloride dihydrate


Bergenin

Beryllium 2,4-pentanedioate

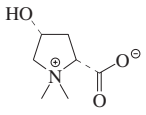
Betaine

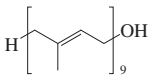
Betaine, hydrochloride

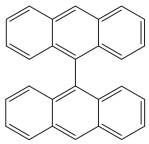
Betamethasone

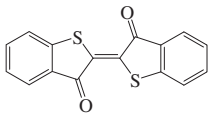
Bethanidine

No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
849	Betonicine		$C_7H_{13}NO_3$	515-25-3	159.183	pr (dil al, +1w)	252 dec				vs EtOH
850	Betulaprenol 9	Nonaisoprenol	$C_{45}H_{74}O$	13190-97-1	631.069	oil or cry	41				s chl
851	9,9'-Bianthracene		$C_{28}H_{18}$	1055-23-8	354.443		321.3				
852	Δ2,2'(3*H*,3'H)-Bibenzo[b] thiophene-3,3'-dione	Durindone Red	$C_{16}H_8O_2S_2$	522-75-8	296.364	br nd (xyl) red mcl nd (bz)	359	sub			i H_2O, EtOH; sl chl, CS_2; s bz, xyl
853	Bicyclo[2.2.1]heptane		C_7H_{12}	279-23-2	96.170		87.5	105.3			vs ace, bz, eth, EtOH
854	Bicyclo[4.1.0]heptane	Norcarane	C_7H_{12}	286-08-8	96.170			116.5	0.853^{25}	1.4564^{20}	
855	Bicyclo[2.2.1]heptan-2-one		$C_7H_{10}O$	497-38-1	110.153		89.5	170			
856	Bicyclo[2.2.1]hept-2-ene		C_7H_{10}	498-66-8	94.154		45	96			
857	Bicyclo[2.2.1]hept-5-ene-2-carbonitrile		C_8H_9N	95-11-4	119.164		13	84^{10}	0.999^{25}	1.4885^{20}	
858	Bicyclo[2.2.1]hept-5-ene-2-carboxaldehyde		$C_8H_{10}O$	5453-80-5	122.164			71^{20}	1.018^{25}	1.4893^{20}	
859	Bicyclo[2.2.1]hept-5-ene-2-methanol		$C_8H_{12}O$	95-12-5	124.180			103^{20}			
860	[1,1'-Bicyclohexyl]-2-one	2-Cyclohexylcyclohexanone	$C_{12}H_{20}O$	90-42-6	180.286	liq	-32	264	0.9696^{25}	1.4877^{25}	
861	1,1'-Bicyclopentyl		$C_{10}H_{18}$	1636-39-1	138.250						s ctc, CS_2
862	[1,1'-Bicyclopentyl]-2-ol	2-Hydroxybicyclopentyl	$C_{10}H_{18}O$	4884-25-7	154.249		20	235.5	0.9785^{15}	1.4884^{17}	
863	[1,1'-Bicyclopentyl]-2-one		$C_{10}H_{16}O$	4884-24-6	152.233	liq	-13	232.5	0.9745^{21}	1.4763	
864	Bifenox	Methyl 5-(2,4-dichlorophenoxy) -2-nitrobenzoate	$C_{14}H_9Cl_2NO_5$	42576-02-3	342.131		85				
865	Bifenthrin		$C_{23}H_{22}ClF_3O_2$	82657-04-3	422.868		69		1.2^{125}		
866	Biguanide	Imidodicarbonimidic diamide	$C_2H_7N_5$	56-03-1	101.111	pr or nd (al)	136	dec 142			vs H_2O; s EtOH; i bz, chl
867	Bikhaconitine	3-Deoxypseudaconitine	$C_{36}H_{51}NO_{11}$	6078-26-8	673.790		164				vs eth, EtOH, chl
868	Bilirubin		$C_{33}H_{36}N_4O_6$	635-65-4	584.662	red mcl pr or pl (chl)					i H_2O; sl EtOH, eth; s bz, chl
869	Biliverdine	Dehydrobilirubin	$C_{33}H_{34}N_4O_6$	114-25-0	582.646	dk grn pl or pr (MeOH)	>300				i H_2O; s EtOH, bz; sl eth, chl, CS_2
870	Binapacryl		$C_{15}H_{18}N_2O_6$	485-31-4	322.313		70		1.27^{20}		
871	1,1'-Binaphthalene	1,1'-Binaphthyl	$C_{20}H_{14}$	604-53-5	254.325	(i) pl(HOAc) (ii) orth (peth)	160	>360; 240^{12}	1.3000^{20}		i H_2O; sl EtOH; s eth, ace, bz, CS_2
872	2,2'-Binaphthalene		$C_{20}H_{14}$	612-78-2	254.325	bl flr pl (al)	187.9	452			i H_2O; sl EtOH; s eth, bz, CS_2
873	[1,1'-Binaphthalene]-2,2'-diol		$C_{20}H_{14}O_2$	602-09-5	286.324	nd (al), cry (w)	220				i H_2O; s EtOH, eth, alk; sl chl
874	Biotin	Coenzyme R	$C_{10}H_{16}N_2O_3S$	58-85-5	244.310	nd (w)	232 dec				s H_2O, EtOH; sl eth, chl
875	2,2'-Bioxirane	Diepoxybutane	$C_4H_6O_2$	1464-53-5	86.090		2.0	144	1.113^{20}	1.435^{20}	vs H_2O, EtOH
876	Biphenyl	Diphenyl	$C_{12}H_{10}$	92-52-4	154.207	lf (dil al)	68.93	256.1	1.04^{20}	1.588^{77}	i H_2O; s EtOH, eth; vs bz, ctc, MeOH
877	[1,1'-Biphenyl]-4-acetic acid	Felbinac	$C_{14}H_{12}O_2$	5728-52-9	212.244		160.5				
878	[1,1'-Biphenyl]-4-carbonitrile		$C_{13}H_9N$	2920-38-9	179.217		88	190^{20}			i H_2O; vs EtOH, eth
879	[1,1'-Biphenyl]-4-carbonyl chloride		$C_{13}H_9ClO$	14002-51-8	216.662		111	160^{2}			
880	[1,1'-Biphenyl]-2,2'-diamine		$C_{12}H_{12}N_2$	1454-80-4	184.236	pr or nd (al)	81	162^{4}	1.3090^{20}		s H_2O, ace, bz
881	[1,1'-Biphenyl]-2,4'-diamine		$C_{12}H_{12}N_2$	492-17-1	184.236	nd (dil al)	54.5	363			i H_2O; s EtOH, eth
882	[1,1'-Biphenyl]-4,4'-diamine, dihydrochloride		$C_{12}H_{14}Cl_2N_2$	531-85-1	257.158		>300				
883	[1,1'-Biphenyl]-2,2'-dicarboxylic acid	*o,o'*-Diphenic acid	$C_{14}H_{10}O_4$	482-05-3	242.227	mcl pr or lf (w) cry (HOAc)	233.5	sub			i H_2O; s EtOH, eth
884	[1,1'-Biphenyl]-2,2'-diol		$C_{12}H_{10}O_2$	1806-29-7	186.206		109	320	1.3420^{20}		s H_2O, EtOH, eth, ace, bz; sl peth, chl
885	[1,1'-Biphenyl]-2,5-diol		$C_{12}H_{10}O_2$	1079-21-6	186.206	nd (dil al)	97.5				vs EtOH
886	[1,1'-Biphenyl]-4,4'-diol		$C_{12}H_{10}O_2$	92-88-6	186.206		278 dec				sl H_2O, bz, DMSO; s EtOH, eth
887	[1,1'-Biphenyl]-4,4'-disulfonic acid		$C_{12}H_{10}O_6S_2$	5314-37-4	314.333	pr	72.5	>200			vs H_2O
888	[1,1'-Biphenyl]-3,3',4,4'-tetramine, tetrahydrochloride		$C_{12}H_{18}Cl_4N_4$	7411-49-6	360.110		245 dec				
889	[1,1'-Biphenyl]-3,3',5,5'-tetrol	Diresorcinol	$C_{12}H_{10}O_4$	531-02-2	218.205	pl or nd (w+2)	310				vs H_2O, eth, EtOH


Betonicine


Betulaprenol 9


9,9'-Bianthracene

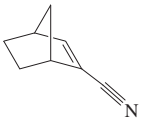

Δ2,2'(3*H*,3'H)-Bibenzo[b]thiophene-3,3'-dione

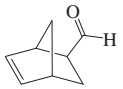

Bicyclo[2.2.1]heptane

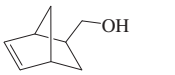

Bicyclo[4.1.0]heptane

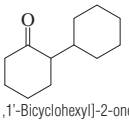

Bicyclo[2.2.1]heptan-2-one

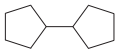

Bicyclo[2.2.1]hept-2-ene

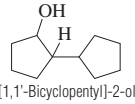

Bicyclo[2.2.1]hept-5-ene-2-carbonitrile

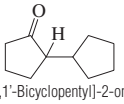

Bicyclo[2.2.1]hept-5-ene-2-carboxaldehyde

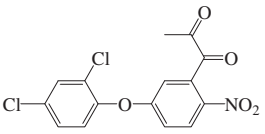

Bicyclo[2.2.1]hept-5-ene-2-methanol

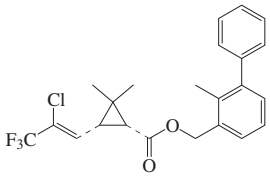

[1,1'-Bicyclohexyl]-2-one

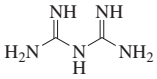

1,1'-Bicyclopentyl

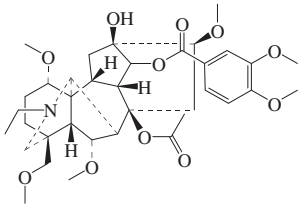

[1,1'-Bicyclopentyl]-2-ol

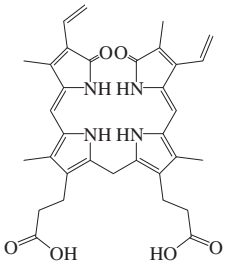

[1,1'-Bicyclopentyl]-2-one

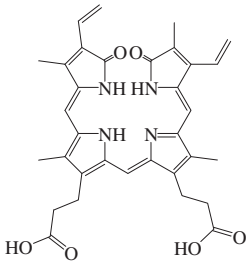

Bifenox

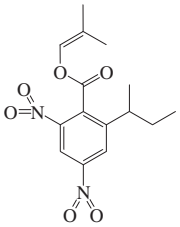

Bifenthrin

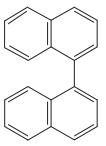

Biguanide

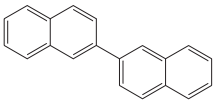

Bikhaconitine

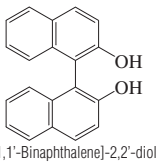

Bilirubin

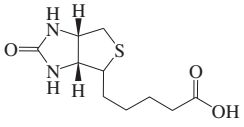

Biliverdine

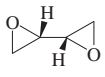

Binapacryl

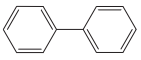

1,1'-Binaphthalene

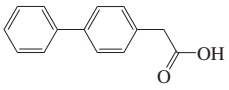

2,2'-Binaphthalene

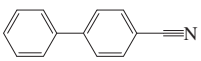

[1,1'-Binaphthalene]-2,2'-diol

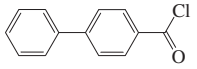

Biotin

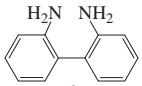

2,2'-Bioxirane

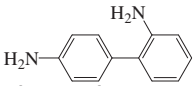

Biphenyl

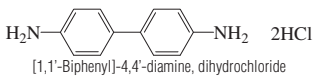

[1,1'-Biphenyl]-4-acetic acid

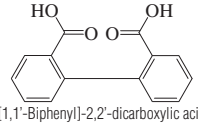

[1,1'-Biphenyl]-4-carbonitrile

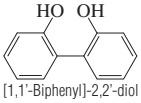

[1,1'-Biphenyl]-4-carbonyl chloride

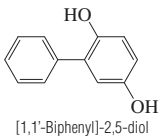

[1,1'-Biphenyl]-2,2'-diamine

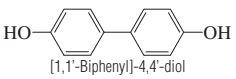

[1,1'-Biphenyl]-2,4'-diamine

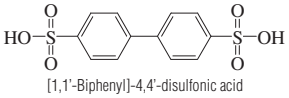

[1,1'-Biphenyl]-4,4'-diamine, dihydrochloride

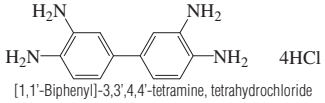

[1,1'-Biphenyl]-2,2'-dicarboxylic acid


[1,1'-Biphenyl]-2,2'-diol


[1,1'-Biphenyl]-2,5-diol


[1,1'-Biphenyl]-4,4'-diol


[1,1'-Biphenyl]-4,4'-disulfonic acid


[1,1'-Biphenyl]-3,3',4,4'-tetramine, tetrahydrochloride

[1,1'-Biphenyl]-3,3',5,5'-tetrol

No.	Name	Synonym	Mol. Form.	CAS RN	Mol. Wt.	Physical Form	mp/°C	bp/°C	den/ g cm^{-3}	n_D	Solubility
890	*N*-[1,1'-Biphenyl]-4-ylacetamide		$C_{14}H_{13}NO$	4075-79-0	211.259	cry (dil MeOH)	172.8				i H_2O; vs EtOH, ace, MeOH
891	1-[1,1'-Biphenyl]-4-ylethanone		$C_{14}H_{12}O$	92-91-1	196.244	pr (ace), cry (al)	121	326	1.2510^{0}		i H_2O; vs EtOH, ace; sl chl
892	2-[1,1'-Biphenyl]-4-yl-5-phenyl-1,3,4-oxadiazole		$C_{20}H_{14}N_2O$	852-38-0	298.337		168				
893	2,2'-Bipyridine	α,α'-Dipyridyl	$C_{10}H_8N_2$	366-18-7	156.184	pr (peth)	72	273.5			sl H_2O; vs EtOH, eth, bz, chl
894	2,3'-Bipyridine	2,3'-Bipyridyl	$C_{10}H_8N_2$	581-50-0	156.184			295.5	1.140^{20}	1.6223^{20}	i H_2O; vs EtOH, eth, bz, chl; sl peth
895	2,4'-Bipyridine	2,4'-Bipyridyl	$C_{10}H_8N_2$	581-47-5	156.184		61.5	281			sl H_2O; vs EtOH, eth, chl
896	3,3'-Bipyridine	3,3'-Bipyridyl	$C_{10}H_8N_2$	581-46-4	156.184		68	291.5	1.1614^{20}		vs H_2O, EtOH; sl eth
897	4,4'-Bipyridine	γ,γ'-Dipyridyl	$C_{10}H_8N_2$	553-26-4	156.184	nd (w+2)	114	305			sl H_2O; vs EtOH, bz, chl; s eth
898	2,2'-Biquinoline		$C_{18}H_{12}N_2$	119-91-5	256.301	pl or lf (al)	196				i H_2O; vs EtOH; s eth, ace, bz
899	4,4'-Bis(acetoacetamido)-3,3'-dimethyl-1,1'-biphenyl	*N,N*-Bis(acetoacetyl)-3,3'-dimethylbenzidine	$C_{22}H_{24}N_2O_4$	91-96-3	380.437		212				sl DMSO
900	Bisacodyl		$C_{22}H_{19}NO_4$	603-50-9	361.391		133.5				
901	Bis(4-amino-3-chlorophenyl) methane	4,4-Methylene-bis(2-chloroaniline)	$C_{13}H_{12}Cl_2N_2$	101-14-4	267.153						s ctc
902	Bis(4-aminocyclohexyl)methane		$C_{13}H_{26}N_2$	1761-71-3	210.358		15	320	0.92^{75}		
903	Bis(2-aminoethyl)amine	Diethylenetriamine	$C_4H_{13}N_3$	111-40-0	103.166	ye hyg liq	-39	207	0.9569^{20}	1.4810^{25}	msc H_2O, EtOH; i eth; s lig
904	*N,N'*-Bis(2-aminoethyl)-1,2-ethanediamine	Triethylenetetramine	$C_6H_{18}N_4$	112-24-3	146.234		12	266.5		1.4971^{20}	s H_2O, EtOH, acid
905	Bis(2-aminophenyl)disulfide		$C_{12}H_{12}N_2S_2$	1141-88-4	248.366		93				i H_2O; vs EtOH, eth
906	Bis(4-aminophenyl)disulfide		$C_{12}H_{12}N_2S_2$	722-27-0	248.366		85				s H_2O; vs EtOH, eth, chl; sl bz, lig
907	1,2-Bis(4-aminophenyl)ethane		$C_{14}H_{16}N_2$	621-95-4	212.290	pl (w)	137	sub			i H_2O; vs EtOH
908	Bis(4-aminophenyl) sulfone	Dapsone	$C_{12}H_{12}N_2O_2S$	80-08-0	248.300	cry (95% al)	175.5				s EtOH; sl DMSO
909	Bis(4-aminophenyl) sulfoxide	4,4'-Sulfinyldianiline	$C_{12}H_{12}N_2OS$	119-59-5	232.300	pr (w, al)	175 dec				s H_2O, EtOH
910	1,4-Bis(3-aminopropoxy)butane	1,4-Butanediol bis(3-aminopropyl) ether	$C_{10}H_{24}N_2O_2$	7300-34-7	204.310	liq		135^{3}	0.96^{20}	1.4619^{20}	
911	*N,N'*-Bis(3-aminopropyl)-1,4-butanediamine	Spermine	$C_{10}H_{26}N_4$	71-44-3	202.340		29	150^{5}			
912	*N,N'*-Bis(3-aminopropyl)-1,4-butanediamine, tetrahydrochloride		$C_{10}H_{30}Cl_4N_4$	306-67-2	348.184		301.5				s H_2O
913	Bis(2-bromoethyl) ether	Bromex	$C_4H_8Br_2O$	5414-19-7	231.914			115^{32}, 92^{12}	1.8452^{20}	1.5131^{27}	
914	1,2-Bis(bromomethyl)benzene		$C_8H_8Br_2$	91-13-4	263.958	orth (chl)	95	$129^{4.5}$	1.988^{25}		i H_2O; s EtOH, eth, ctc, chl, peth, lig
915	1,3-Bis(bromomethyl)benzene		$C_8H_8Br_2$	626-15-3	263.958	nd (chl), pr (ace)	77	137^{20}	1.959^{25}		i H_2O; s EtOH, eth, chl, lig
916	1,4-Bis(bromomethyl)benzene		$C_8H_8Br_2$	623-24-5	263.958	mcl pr (al), cry (chl, bz)	144.5	245	2.012^{25}		i H_2O; vs EtOH, chl; sl eth; s bz
917	2,2-Bis(bromomethyl)-1,3-propanediol	Pentaerythritol dibromide	$C_5H_{10}Br_2O_2$	3296-90-0	261.940	nd (bz)	113				
918	1,3-Bis(bromomethyl) tetramethyldisiloxane		$C_6H_{16}Br_2OSi_2$	2351-13-5	320.169			233; 103^{15}	1.3918^{25}	1.4719^{25}	
919	Bis(4-bromophenyl) ether		$C_{12}H_8Br_2O$	2050-47-7	327.999	lf (al)	60.5	339	1.8^{25}		i H_2O; s EtOH, bz; vs eth; sl chl
920	Bis(2-(2-butoxyethoxy)ethyl) adipate		$C_{22}H_{42}O_8$	141-17-3	434.563	liq			1.1^{25}		
921	1,4-Bis(α-(*tert*-butyldioxy) isopropyl)benzene		$C_{20}H_{34}O_4$	2781-00-2	338.482	cry	79				
922	Bis(3-*tert*-butyl-5-ethyl-2-hydroxyphenyl)methane		$C_{25}H_{36}O_2$	88-24-4	368.553	cry	123				
923	Bis(4-chlorobenzoyl) peroxide		$C_{14}H_8Cl_2O_4$	94-17-7	311.118	pr cry (bz)	141				
924	1,2-Bis(2-chloroethoxy)ethane		$C_6H_{12}Cl_2O_2$	112-26-5	187.064			232	1.195^{20}	1.4592^{25}	s ctc
925	Bis(2-chloroethoxy)methane		$C_5H_{10}Cl_2O_2$	111-91-1	173.037			215.0			
926	*N,N*-Bis(2-chloroethyl)aniline	Aniline mustard	$C_{10}H_{13}Cl_2N$	553-27-5	218.123	pr	45	164^{14}			sl eth; s EtOH, MeOH
927	Bis(2-chloroethyl) carbonate		$C_5H_8Cl_2O_3$	623-97-2	187.021		8	241	1.3506^{20}	1.461^{20}	i H_2O
928	Bis(2-chloroethyl) 2-chloroethylphosphonate		$C_6H_{12}Cl_3O_3P$	6294-34-4	269.490			170.2^{25}		1.488^{25}	