

Common Polyatomic Ions by Charge and Ion Family

+1 Charge	-1 Charge
Ammonium NH ₄ ⁺	Dihydrogen phosphite H ₂ PO ₃ ⁻
Hydronium H ₃ O ⁺	Dihydrogen phosphate H ₂ PO ₄ ⁻
	Hydrogen carbonate HCO ₃ ⁻
Ammonia NH ₃	Hydrogen sulfite HSO ₃ ⁻
	Hydrogen sulfate HSO ₄ ⁻
	Nitrite NO ₂ ⁻
	Nitrate NO ₃ ⁻
	Hydroxide OH ⁻
	Acetate CH ₃ COO ⁻
	Chromite CrO ₂ ⁻
	Cyanide CN ⁻
	Cyanate CNO ⁻
	Thiocyanate CNS ⁻
	Superoxide O ₂ ⁻
	Permanganate MnO ₄ ⁻
	Hypochlorite ClO ⁻
	Chlorite ClO ₂ ⁻
	Chlorate ClO ₃ ⁻
	Perchlorate ClO ₄ ⁻
	Hypobromite BrO ⁻
	Bromite BrO ₂ ⁻
	Bromate BrO ₃ ⁻
	Perbromate BrO ₄ ⁻
	Hypoiodite IO ⁻
	Iodite IO ₂ ⁻
	Iodate IO ₃ ⁻
	Periodate IO ₄ ⁻
	Aluminate AlO ₂ ⁻
	Azide N ₃ ⁻
	Benzoate C ₆ H ₅ COO ⁻

CHEMISTRY

-2 Charge	-3 Charge
Hydrogen phosphite HPO ₃ ²⁻	Phosphite PO ₃ ³⁻
Hydrogen phosphate HPO ₄ ²⁻	Phosphate PO ₄ ³⁻
Carbonate CO ₃ ²⁻	Hypophosphite PO ₂ ³⁻
Sulfite SO ₃ ²⁻	Arsenite AsO ₃ ³⁻
Sulfate SO ₄ ²⁻	Arsenate AsO ₄ ³⁻
Thiosulfate S ₂ O ₃ ²⁻	
Silicate SiO ₃ ²⁻	
Carbide C ₂ ²⁻	
Oxalate C ₂ O ₄ ²⁻	
Chromate CrO ₄ ²⁻	
Dichromate Cr ₂ O ₇ ²⁻	
Tartrate C ₄ H ₄ O ₆ ²⁻	
Molybdate MoO ₄ ²⁻	
Peroxide O ₂ ²⁻	
Disulfide S ₂ ²⁻	
Oxalate C ₂ O ₄ ²⁻	

Strong Acids and Bases

Acids	Bases
Hydrochloric Acid HCl	Lithium Hydroxide LiOH
Hydrobromic Acid HBr	Sodium Hydroxide NaOH
Hydroiodic Acid HI	Potassium Hydroxide KOH
Nitric Acid HNO ₃	Rubidium Hydroxide RbOH
Sulfuric Acid H ₂ SO ₄	Cesium Hydroxide CsOH
Perchloric Acid HClO ₄	*Calcium Hydroxide Ca(OH) ₂
	*Strontium Hydroxide Sr(OH) ₂
	*Barium Hydroxide Ba(OH) ₂

Functional Groups

Alcohol	R-OH	1°	
Amine	R-N-R	2°	
Ether	R-O-R	3°	
Aldehyde	R-C(=O)-H	4°	
Amide	R-C(=O)-N-R	n-butyl	
Carboxylic Acid	R-C(=O)-OH	iso-butyl	
Ester	R-C(=O)-O-R	sec-butyl	
Ketone	R-C(=O)-R	tert-butyl	

Fundamental Constants

Atomic mass unit (amu)	1 amu	= 1.66053873 x 10 ⁻²⁷ kg
	1 kg	= 6.02214199 x 10 ²³ amu
Avogadro's number	N _A	= 6.02214199 x 10 ²³ mol ⁻¹
Bohr radius	a ₀	= 5.29177211 x 10 ⁻¹¹ m
Boltzmann's constant	k	= 1.38065052 x 10 ⁻²³ J / K
Electron charge	e	= 1.60217653 x 10 ⁻¹⁹ C
Faraday's constant	F	= 9.64853383 x 10 ¹⁹ C/mol
Gas constant	R	= 0.08205821 (L • atm / mol • K) = 8.31447215 J / (mol • K)
Mass of an electron	m _e	= 5.48579909 x 10 ⁻³¹ amu = 9.10938262 x 10 ⁻³¹ kg
Mass of a neutron	m _n	= 1.00866492 amu = 1.67492728 x 10 ⁻²⁷ kg
Mass of a proton	m _p	= 1.00727647 amu = 1.67262171 x 10 ⁻²⁷ kg
Planck's constant	h	= 6.62606931 x 10 ⁻³⁴ J • s
Speed of light in vacuum	c	= 2.99792458 x 10 ⁸ m/s

Conversion Factors & SI Units

Length (m)	Temperature (K)	Energy (J)	Pressure (Pa)	Volume (m ³)	Mass (kg)	Geometric Relationships
1 m = 1.0936 yd	0 K = -273.15 °C	1 J = 1 kg • m ² / s ²	1 Pa = 1 N / m ²	1 L = 10 ⁻³ m ³	1 kg = 2.2046 lb	π = 3.14159...
1 cm = 0.39370 in	= -459.67 °F	= 0.23901 cal	= 1 kg / (m • s ²)	= 1 dm ³	1 lb = 453.59 g	Circumference of a circle = 2πr
1 in = 2.54 cm	K = °C + 273.15	= 1 C • V	1 atm = 101,325 Pa	= 10 ³ cm ³	= 16 oz	Area of a circle = πr ²
1 km = 0.62137 mi		= 9.4781 x 10 ⁴ Btu	= 760 torr	= 1.0567 qt	1 amu = 1.66053873 x 10 ⁻²⁷ kg	Surface area of a sphere = 4πr ²
1 mi = 5280 ft	°C = (°F - 32) / 1.8	1 cal = 4.184 J	= 14.70 lb / in ²	1 gal = 4 qt	1 ton = 2000 lb	Volume of a sphere = 4/3 πr ³
= 1.6093 km	°F = 1.8 (°C) + 32	1 eV = 1.6022 x 10 ⁻¹⁹ J	1 bar = 10 ⁵ Pa	= 16.39 cm ³	= 907.185 kg	Volume of a cylinder = πr ² h
1 Å = 10 ⁻¹⁰ m			1 torr = 1 mmHg	1 cm ³ = 1 mL	1 metric ton = 1000 kg	
				1 in ³ = 16.39 cm ³	= 2204.6 lb	
					1 qt = 32 fluid oz	

SI Unit Prefixes

a	f	p	n	μ	m	c	d	k	M	G	T	P	E
atto	femto	pico	nano	micro	milli	centi	deci	kilo	mega	giga	tera	peta	exa