

# Periodic Chart of the Elements and Ions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
IA	IIA	IIIB	IVB	VB	VIB	VIIIB	VIII	IB	IIIB	IVB	VIB	VIIA	IVA	VA	VIA	VIIA	VIIIA or O
1 H hydrogen 1.01 H <sup>+</sup> hydrogen	2 He helium 4.00	3 Li lithium 6.94 Li <sup>+</sup> lithium	4 Be beryllium 9.01 Be <sup>2+</sup> beryllium	5 B boron 10.81 B <sup>3+</sup> boron	6 C carbon 12.01 C carbon	7 N nitrogen 14.01 N <sup>3-</sup> nitride	8 O oxygen 16.00 O <sup>2-</sup> oxide	9 F fluorine 19.00 F <sup>-</sup> fluoride	10 Ne neon 20.17	11 Na sodium 22.99 Na <sup>+</sup> sodium	12 Mg magnesium 24.31 Mg <sup>2+</sup> magnesium	13 Al aluminum 26.98 Al <sup>3+</sup> aluminum	14 Si silicon 28.09 Si silicon	15 P phosphorus 30.97 P <sup>3-</sup> phosphide	16 S sulphur 32.06 S <sup>2-</sup> sulphide	17 Cl chlorine 35.45 Cl <sup>-</sup> chloride	18 Ar argon 39.95 Ar argon
19 K potassium 39.10 K <sup>+</sup> potassium	20 Ca calcium 40.08 Ca <sup>2+</sup> calcium	21 Sc scandium 44.96 Sc <sup>3+</sup> scandium	22 Ti titanium 47.90 Ti <sup>4+</sup> titanium (IV) Ti <sup>3+</sup> titanium (III)	23 V vanadium 50.94 V <sup>5+</sup> vanadium (V) V <sup>4+</sup> vanadium (IV)	24 Cr chromium 52.00 Cr <sup>3+</sup> chromium (III) Cr <sup>2+</sup> chromium (II)	25 Mn manganese 54.94 Mn <sup>2+</sup> manganese (II) Mn <sup>3+</sup> manganese (III) Mn <sup>4+</sup> manganese (IV)	26 Fe iron 55.85 Fe <sup>3+</sup> iron (III) Fe <sup>2+</sup> iron (II)	27 Co cobalt 58.93 Co <sup>2+</sup> cobalt (II) Co <sup>3+</sup> cobalt (III)	28 Ni nickel 58.71 Ni <sup>2+</sup> nickel (II) Ni <sup>3+</sup> nickel (III)	29 Cu copper 63.55 Cu <sup>2+</sup> copper (II) Cu <sup>+</sup> copper (I)	30 Zn zinc 65.38 Zn <sup>2+</sup> zinc	31 Ga gallium 69.72 Ga <sup>3+</sup> gallium	32 Ge germanium 72.59 Ge <sup>4+</sup> germanium	33 As arsenic 74.92 As <sup>3-</sup> arsenide	34 Se selenium 78.96 Se <sup>2-</sup> selenide	35 Br bromine 79.90 Br <sup>-</sup> bromide	36 Kr krypton 83.80 Kr krypton
37 Rb rubidium 85.47 Rb <sup>+</sup> rubidium	38 Sr strontium 87.62 Sr <sup>2+</sup> strontium	39 Y yttrium 88.91 Y <sup>3+</sup> yttrium	40 Zr zirconium 91.22 Zr <sup>4+</sup> zirconium	41 Nb niobium 92.91 Nb <sup>5+</sup> niobium (V) Nb <sup>3+</sup> niobium (III)	42 Mo molybdenum 95.94 Mo <sup>6+</sup> molybdenum	43 Tc technetium (98.91) Tc <sup>7+</sup> technetium	44 Ru ruthenium 101.07 Ru <sup>3+</sup> ruthenium (III) Ru <sup>4+</sup> ruthenium (IV)	45 Rh rhodium 102.91 Rh <sup>3+</sup> rhodium	46 Pd palladium 106.40 Pd <sup>2+</sup> palladium (II) Pd <sup>4+</sup> palladium (IV)	47 Ag silver 107.87 Ag <sup>+</sup> silver	48 Cd cadmium 112.41 Cd <sup>2+</sup> cadmium	49 In indium 114.82 In <sup>3+</sup> indium	50 Sn tin 118.69 Sn <sup>4+</sup> tin (IV) Sn <sup>2+</sup> tin (II)	51 Sb antimony 121.75 Sb <sup>3+</sup> antimony (III) Sb <sup>5+</sup> antimony (V)	52 Te tellurium 127.60 Te <sup>2-</sup> telluride	53 I iodine 126.90 I <sup>-</sup> iodide	54 Xe xenon 131.30 Xe xenon
55 Cs cesium 132.91 Cs <sup>+</sup> cesium	56 Ba barium 137.33 Ba <sup>2+</sup> barium	57-71 Lanthanides 89-103	72 Hf hafnium 178.49 Hf <sup>4+</sup> hafnium	73 Ta tantalum 180.95 Ta <sup>5+</sup> tantalum	74 W tungsten 183.85 W <sup>6+</sup> tungsten	75 Re rhenium 186.21 Re <sup>7+</sup> rhenium	76 Os osmium 190.20 Os <sup>8+</sup> osmium	77 Ir iridium 192.22 Ir <sup>4+</sup> iridium	78 Pt platinum 195.09 Pt <sup>4+</sup> platinum (IV) Pt <sup>2+</sup> platinum (II)	79 Au gold 196.97 Au <sup>3+</sup> gold (III) Au <sup>+</sup> gold (I)	80 Hg mercury 200.59 Hg <sup>2+</sup> mercury (II) Hg <sup>+</sup> mercury (I)	81 Tl thallium 204.37 Tl <sup>3+</sup> thallium (III) Tl <sup>+</sup> thallium (I)	82 Pb lead 207.19 Pb <sup>2+</sup> lead (II) Pb <sup>4+</sup> lead (IV)	83 Bi bismuth 208.98 Bi <sup>3+</sup> bismuth (III) Bi <sup>5+</sup> bismuth (V)	84 Po polonium (208.98) Po <sup>2-</sup> polonium (II) Po <sup>4+</sup> polonium (IV)	85 At astatine (209.98) At <sup>-</sup> astatide	86 Rn radon (222) Rn radon
87 Fr francium (223.02) Fr <sup>+</sup> francium	88 Ra radium (226.03) Ra <sup>2+</sup> radium	89-103 Actinides	104 Unq ununilquadium (266.11)	105 Unp ununpentium (262.11)	106 Unh ununhexium (263.12)	107 Uns ununseptium (262.12)	108 Uno ununoctium (265)	109 Unel ununennium (266)									

**Legend for the elements**

Solid	Liquid	Gas	Seidom forms ions
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**Note:** The legend at the right denotes the physical state of the elements at 101.325 kPa and 298.15 K (25°C)

**Table of Polyatomic Ions and Elements**

Polyatomic ions	Elements
acetate CH <sub>3</sub> COO <sup>-</sup>	arsatine As <sub>2</sub>
ammonium NH <sub>4</sub> <sup>+</sup>	bromine Br <sub>2</sub>
benzoate C <sub>6</sub> H <sub>5</sub> COO <sup>-</sup>	chlorine Cl <sub>2</sub>
borate BO <sub>3</sub> <sup>3-</sup>	fluorine F <sub>2</sub>
carbonate CO <sub>3</sub> <sup>2-</sup>	hydrogen H <sub>2</sub>
hydrogen carbonate HCO <sub>3</sub> <sup>-</sup>	iodine I <sub>2</sub>
chlorate ClO <sub>3</sub> <sup>-</sup>	nitrogen N <sub>2</sub>
hypochlorite ClO <sup>-</sup>	oxygen O <sub>2</sub>
chromate CrO <sub>4</sub> <sup>2-</sup>	phosphorus P <sub>4</sub>
dichromate Cr <sub>2</sub> O <sub>7</sub> <sup>2-</sup>	sulphur S <sub>8</sub>
cyanide CN <sup>-</sup>	
hydrogen phosphate HPO <sub>4</sub> <sup>2-</sup>	
hydrogen sulphide HS <sup>-</sup>	
dihydrogen phosphate H <sub>2</sub> PO <sub>4</sub> <sup>-</sup>	
hydrogen sulphate HSO <sub>4</sub> <sup>-</sup>	
silicate SiO <sub>3</sub> <sup>2-</sup>	
permanganate MnO <sub>4</sub> <sup>2-</sup>	
suphate SO <sub>4</sub> <sup>2-</sup>	

**Key**

91	Pa	protactinium 231.04
	Pa <sup>5+</sup>	protactinium (V)
	Pa <sup>4+</sup>	protactinium (IV)

Based on <sup>12</sup>C

Most stable or common ion is listed above dotted line

( ) Indicates mass of the most stable isotope

Atomic number →  
Name of the element →  
Atomic mass →

Symbol of the element  
Ion charge  
Stock name (IUPAC)  
Symbol of ion