

CHEMISTRY BACKGROUNDER

The three tables provided here are designed to help you in your study of chemistry. The first table lists the properties of elements of the first 20 elements of the periodic table,

along with several other common elements. The second table gives the chemical names and formulas and main uses of a range of common elements and compounds. The third table is a one-page periodic table for easy reference.

Properties of Elements 1 to 20 and Selected Common Elements

Atomic Number	Name	Colour	Melting Point (°C)	Boiling Point (°C)	Density (g/cm ³)	State and Other Properties
1	H hydrogen	colourless	−259	−253	0.09	gas, reacts with oxygen when ignited with a spark
2	He helium	colourless	−272	−269	0.18	gas, unreactive, odourless
3	Li lithium	fresh-cut surface is silvery	181	1342	0.54	solid, soft, reacts with water to form hydrogen
4	Be beryllium	lead grey	1287	2469	1.85	solid, resists oxidation in air
5	B boron	black	2076	3927	2.46	solid, semiconductor
6	C carbon	graphite is black, diamond is colourless	3527	4027	2.27	graphite is soft solid, diamond is very hard solid, unique in the vast number of compounds it can form
7	N nitrogen	colourless	−210	−196	1.25	gas, odourless, does not react with air or water
8	O oxygen	gas is colourless, liquid is pale blue	−218	−183	1.43	gas, very reactive
9	F fluorine	pale yellow	−220	−188	1.70	gas, most reactive element
10	Ne neon	colourless	−249	−246	0.90	gas, very inert
11	Na sodium	silvery	98	883	0.97	solid, soft, reacts with water to form hydrogen
12	Mg magnesium	silvery white	650	1090	1.74	solid, burns brightly in air, does not react with water
13	Al aluminum	silvery	660	2519	2.70	solid, non-toxic, soft
14	Si silicon	dark grey with a bluish tinge	1414	2900	2.33	solid

Atomic Number	Name	Colour	Melting Point (°C)	Boiling Point (°C)	Density (g/cm ³)	State and Other Properties
15	P phosphorus		44	277	1.82	solid, white phosphorus spontaneously ignites in air
16	S sulfur	lemon yellow	115	445	1.96	solid, odourless, brittle, insoluble in water
17	Cl chlorine	yellowish green	-102	-34	3.21	gas, reacts with nearly all elements, respiratory irritant
18	Ar argon	colourless	-189	-186	1.78	gas, odourless, very inert
19	K potassium	silvery white	63	759	0.86	solid, very soft, reacts with water to produce hydrogen
20	Ca calcium	silvery white	842	1484	1.55	solid, burns in air when ignited, reacts slowly with water, fairly hard
26	Fe iron	lustrous grey	1538	2861	7.87	solid, reactive
28	Ni nickel	lustrous silver	1455	2913	8.91	solid, hard, malleable, ductile, somewhat ferromagnetic, fair conductor
29	Cu copper	shiny reddish	1085	2927	8.92	solid, malleable, ductile, good conductor
30	Zn zinc	bluish pale grey	420	907	7.14	solid, brittle at room temperature, tarnishes in moist air, does not react with water
35	Br bromine	red-brown	-7	59	3.12	liquid, volatile, unpleasant odour, irritates membranes
47	Ag silver	shiny silver	962	2162	10.49	solid, very ductile and malleable, highest conductivity, tarnishes when exposed to air containing sulfur
50	Sn tin	silvery grey	232	2602	7.31	solid, malleable, somewhat ductile, does not react with water
79	Au gold	shiny yellow	1064	2856	19.30	solid, most malleable and ductile metal, good conductor, does not react with air or water
80	Hg mercury	silvery white	-39	357	13.55	liquid, poor conductor of heat relative to other metals, fair conductor of electricity, alloys easily
82	Pb lead	lustrous bluish white	327	1749	11.34	solid, very soft, highly malleable, ductile, relatively poor electrical conductor

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Common Elements and Compounds

Common Name	Scientific Name	Chemical Formula	Main Uses
Acetic acid	ethanoic acid	$\text{CH}_3\text{COOH}_{(aq)}$	vinegar
Acetone	propanone	$(\text{CH}_3)_2\text{CO}_{(l)}$	nail polish remover
Ammonia water	ammonia	$\text{NH}_3_{(aq)}$	cleansers, deodorizers, etching of aluminum
ASA	acetylsalicylic acid	$\text{CH}_3\text{COOC}_6\text{H}_4\text{COOH}_{(s)}$	pain reliever
Aspartame	aspartyl-phenylalanine methyl ester	$\text{C}_{14}\text{H}_{18}\text{N}_2\text{O}_5_{(s)}$	artificial sweetener
Baking soda	sodium hydrogen carbonate	$\text{NaHCO}_3_{(s)}$	raising agent in food
Battery acid	sulfuric acid	$\text{H}_2\text{SO}_4_{(aq)}$	car batteries
Bleach/chlorine	sodium hypochlorite	$\text{NaOCl}_{(aq)}$	laundry bleach, disinfectant for swimming pools, water supply
Bromine	bromine	$\text{Br}_{2(g)}$	fumigants, water purification, flame proofing agents, pesticides
CFCs (e.g., freons)	chlorofluorocarbons (e.g., trichlorofluoromethane)	e.g., $\text{CCl}_3\text{F}_{(l)}$	refrigerants, asthma inhalers, circuit board cleaners
Chlorine	chlorine	$\text{Cl}_{2(g)}$	water treatment, production of paper, dyes, textiles, cleansers
Citric acid	2-hydroxy-1,2,3-propanetricarboxylic acid	$\text{C}_3\text{H}_4\text{OH}(\text{COOH})_3_{(s)}$	large amounts in citrus fruits, pH control in foods
Dry ice	carbon dioxide	$\text{CO}_{2(s)}$	carbonated beverages
Fluorine	fluorine	$\text{F}_{2(g)}$	uranium production, HCFC production
Glucose	glucose	$\text{C}_6\text{H}_{12}\text{O}_6_{(s)}$	energy source for organisms
Graphite	carbon	$\text{C}_{(s)}$	metal production, pencils
Gypsum	calcium sulfate dihydrate	$\text{CaSO}_4 \cdot 2(\text{H}_2\text{O})_{(s)}$	drywall
Hydrogen	hydrogen	$\text{H}_{2(g)}$	rocket fuel, hydrogenation of oils, cryogenics
Iodine	iodine	$\text{I}_{2(s)}$	wound disinfectant, internal medicine, photography, nutrient
Lime	calcium oxide	$\text{CaO}_{(s)}$	mortar, steel and glass making, smoke-stack scrubbers
Limestone	calcium carbonate	$\text{CaCO}_3_{(s)}$	cement and mortar, chalk, marble

Common Name	Scientific Name	Chemical Formula	Main Use
Milk of magnesia	magnesium hydroxide	$\text{Mg(OH)}_{2(s)}$	antacid medication
MSG	monosodium glutamate	$\text{C}_5\text{H}_8\text{NO}_4\text{Na}_{(s)}$	flavour enhancer
Muriatic acid	hydrochloric acid	$\text{HCl}_{(aq)}$	tile cleaner, etching of masonry and marble surfaces
Natural gas	methane	$\text{CH}_{4(g)}$	fuel
Oxygen	oxygen	$\text{O}_{2(g)}$ and $\text{O}_{3(g)}$	rocket fuel, respiratory aid, steel production, cellular respiration, ozone filters out UV rays
PCBs	polychlorinated biphenyls	$\text{C}_{12}\text{H}_{10-n}\text{Cl}_n$	electrical transformers
Peroxide	hydrogen peroxide	$\text{H}_2\text{O}_{2(aq)}$	antiseptic, disinfectant, bleaching agent
Potash	potassium chloride	$\text{KCl}_{(s)}$	fertilizer
Road salt	calcium chloride	$\text{CaCl}_{2(s)}$	de-icing and dust control of roads
Rotten egg gas	hydrogen sulfide	$\text{H}_2\text{S}_{(g)}$	dye, tanning, wood pulp industries
Rubbing alcohol	2-propanol	$\text{CH}_3\text{CHOHCH}_3(l)$	antiseptic
Silica sand	silicon dioxide	$\text{SiO}_{2(s)}$	glass
Silver nitrate	silver nitrate	$\text{AgNO}_{3(s)}$	antiseptic, photography, treatment of warts
Soda ash	sodium carbonate	$\text{Na}_2\text{CO}_{3(s)}$	glass, paper, and detergent production
Sugar	sucrose	$\text{C}_{12}\text{H}_{22}\text{O}_{11(s)}$	sweetener, preservative, food for yeast
Table salt	sodium chloride	$\text{NaCl}_{(s)}$	flavour
Urea (carbamide)	urea	$\text{NH}_2\text{CONH}_{2(s)}$	fertilizers, pharmaceuticals, and resins
Vitamin C	ascorbic acid	$\text{C}_6\text{H}_8\text{O}_6(s)$	production of connective tissue, antioxidant
Washing soda	sodium carbonate decahydrate	$\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}_{(s)}$	laundry detergent booster

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Periodic Table

1
1 **H**¹⁺
Hydrogen
1.0

- Solid **S** Metal
- Liquid **Br** Metalloid
- Gas **He** Non-metal

atomic number — 8 — ion charge
symbol — **O** —
name — Oxygen —
atomic mass — 16.0 —

1	2												13	14	15	16	17	18
3	4											5	6	7	8	9	10	
11	12											13	14	15	16	17	18	
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	
87	88	89	104	105	106	107	108	109	110	111	112							
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Uun	Uuu	Uub							
(223)	(226)	(227)	(261)	(262)	(263)	(262)	(265)	(266)	269	272	277							

58	59	60	61	62	63	64	65	66	67	68	69	70	71
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Cerium	Praseodymium	Neodymium	Promethium	Samarium	Europium	Gadolinium	Terbium	Dysprosium	Holmium	Erbium	Thulium	Ytterbium	Lutetium
140.1	140.9	144.2	(145)	150.4	152.0	157.3	158.9	162.5	164.9	167.3	168.9	173.0	175.0
90	91	92	93	94	95	96	97	98	99	100	101	102	103
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lw
Thorium	Protactinium	Uranium	Neptunium	Plutonium	Americium	Curium	Berkelium	Californium	Einsteinium	Fermium	Mendelevium	Nobelium	Lawrencium
232.0	231.0	238.0	(237)	(244)	(243)	(247)	(247)	251	252	257	258	259	262