

PERIODIC TABLE OF THE ELEMENTS

Group 1 IA	2 IIA	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8 VIII	9 VIII	10 VIII	11 IB	12 IIB	13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA
1 H Hydrogen 1.00794 1s ¹	2 He Helium 4.0026 1s ²	3 Li Lithium 6.939 1s ² 2s ¹	4 Be Beryllium 9.0122 1s ² 2s ²	5 B Boron 10.811 1s ² 2s ² 2p ¹	6 C Carbon 12.011 1s ² 2s ² 2p ²	7 N Nitrogen 14.0067 1s ² 2s ² 2p ³	8 O Oxygen 15.9994 1s ² 2s ² 2p ⁴	9 F Fluorine 18.9984 1s ² 2s ² 2p ⁵	10 Ne Neon 20.180 1s ² 2s ² 2p ⁶	11 Na Sodium 22.9898 (Ne) 3s ¹	12 Mg Magnesium 24.305 (Ne) 3s ²	13 Al Aluminum 26.9815 (Ne) 3s ² 3p ¹	14 Si Silicon 28.086 (Ne) 3s ² 3p ²	15 P Phosphorus 30.9738 (Ne) 3s ² 3p ³	16 S Sulfur 32.064 (Ne) 3s ² 3p ⁴	17 Cl Chlorine 35.453 (Ne) 3s ² 3p ⁵	18 Ar Argon 39.948 (Ne) 3s ² 3p ⁶
19 K Potassium 39.098 (Ar) 4s ¹	20 Ca Calcium 40.08 (Ar) 4s ²	21 Sc Scandium 44.956 (Ar) 3d ¹ 4s ²	22 Ti Titanium 47.90 (Ar) 3d ² 4s ²	23 V Vanadium 50.942 (Ar) 3d ³ 4s ²	24 Cr Chromium 51.996 (Ar) 3d ⁵ 4s ¹	25 Mn Manganese 54.938 (Ar) 3d ⁵ 4s ²	26 Fe Iron 55.847 (Ar) 3d ⁶ 4s ²	27 Co Cobalt 58.933 (Ar) 3d ⁷ 4s ²	28 Ni Nickel 58.69 (Ar) 3d ⁸ 4s ²	29 Cu Copper 63.54 (Ar) 3d ¹⁰ 4s ¹	30 Zn Zinc 65.37 (Ar) 3d ¹⁰ 4s ²	31 Ga Gallium 69.72 (Ar) 3d ¹⁰ 4s ² 4p ¹	32 Ge Germanium 72.59 (Ar) 3d ¹⁰ 4s ² 4p ²	33 As Arsenic 74.922 (Ar) 3d ¹⁰ 4s ² 4p ³	34 Se Selenium 78.96 (Ar) 3d ¹⁰ 4s ² 4p ⁴	35 Br Bromine 79.904 (Ar) 3d ¹⁰ 4s ² 4p ⁵	36 Kr Krypton 83.80 (Ar) 3d ¹⁰ 4s ² 4p ⁶
37 Rb Rubidium 85.47 (Kr) 5s ¹	38 Sr Strontium 87.62 (Kr) 5s ²	39 Y Yttrium 88.905 (Kr) 4d ¹ 5s ²	40 Zr Zirconium 91.22 (Kr) 4d ² 5s ²	41 Nb Niobium 92.906 (Kr) 4d ⁴ 5s ¹	42 Mo Molybdenum 95.94 (Kr) 4d ⁵ 5s ¹	43 Tc Technetium (99) (Kr) 4d ⁵ 5s ²	44 Ru Ruthenium 101.07 (Kr) 4d ⁷ 5s ¹	45 Rh Rhodium 102.905 (Kr) 4d ⁸ 5s ¹	46 Pd Palladium 106.4 (Kr) 4d ¹⁰	47 Ag Silver 107.870 (Kr) 4d ¹⁰ 5s ¹	48 Cd Cadmium 112.41 (Kr) 4d ¹⁰ 5s ²	49 In Indium 114.82 (Kr) 4d ¹⁰ 5s ² 5p ¹	50 Sn Tin 118.69 (Kr) 4d ¹⁰ 5s ² 5p ²	51 Sb Antimony 121.76 (Kr) 4d ¹⁰ 5s ² 5p ³	52 Te Tellurium 127.60 (Kr) 4d ¹⁰ 5s ² 5p ⁴	53 I Iodine 126.904 (Kr) 4d ¹⁰ 5s ² 5p ⁵	54 Xe Xenon 131.30 (Kr) 4d ¹⁰ 5s ² 5p ⁶
55 Cs Cesium 132.905 (Xe) 6s ¹	56 Ba Barium 137.33 (Xe) 6s ²	57 La Lanthanum 138.91 (Xe) 5d ¹ 6s ²	72 Hf Hafnium 178.49 (Xe) 4f ¹⁴ 5d ² 6s ²	73 Ta Tantalum 180.948 (Xe) 4f ¹⁴ 5d ³ 6s ²	74 W Tungsten 183.85 (Xe) 4f ¹⁴ 5d ⁴ 6s ²	75 Re Rhenium 186.2 (Xe) 4f ¹⁴ 5d ⁵ 6s ²	76 Os Osmium 190.2 (Xe) 4f ¹⁴ 5d ⁶ 6s ²	77 Ir Iridium 192.2 (Xe) 4f ¹⁴ 5d ⁷ 6s ²	78 Pt Platinum 195.09 (Xe) 4f ¹⁴ 5d ⁹ 6s ¹	79 Au Gold 196.967 (Xe) 4f ¹⁴ 5d ¹⁰ 6s ¹	80 Hg Mercury 200.59 (Xe) 4f ¹⁴ 5d ¹⁰ 6s ²	81 Tl Thallium 204.38 (Xe) 4f ¹⁴ 5d ¹⁰ 6s ² 6p ¹	82 Pb Lead 207.19 (Xe) 4f ¹⁴ 5d ¹⁰ 6s ² 6p ²	83 Bi Bismuth 208.980 (Xe) 4f ¹⁴ 5d ¹⁰ 6s ² 6p ³	84 Po Polonium (209) (Xe) 4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁴	85 At Astatine (210) (Xe) 4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁵	86 Rn Radon (222) (Xe) 4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁶
87 Fr Francium (223) (Rn) 7s ¹	88 Ra Radium (226) (Rn) 7s ²	89 Ac Actinium (227) (Rn) 6d ¹ 7s ²	104 Rf Rutherfordium (267) (Rn) 5f ¹⁴ 6d ² 7s ²	105 Db Dubnium (268) (Rn) 5f ¹⁴ 6d ³ 7s ²	106 Sg Seaborgium (271) (Rn) 5f ¹⁴ 6d ⁴ 7s ²	107 Bh Bohrium (272) (Rn) 5f ¹⁴ 6d ⁵ 7s ²	108 Hs Hassium (270) (Rn) 5f ¹⁴ 6d ⁶ 7s ²	109 Mt Meitnerium (276) (Rn) 5f ¹⁴ 6d ⁷ 7s ²	110 Ds Darmstadtium (281) (Rn) 5f ¹⁴ 6d ⁸ 7s ²	111 Rg Roentgenium (280) (Rn) 5f ¹⁴ 6d ⁹ 7s ²	112 Cn Copernicium (285) (Rn) 5f ¹⁴ 6d ¹⁰ 7s ²	113 Nh Nihonium (284) (Rn) 5f ¹⁴ 6d ¹⁰ 7s ² 7p ¹	114 Fl Flerovium (289) (Rn) 5f ¹⁴ 6d ¹⁰ 7s ² 7p ²	115 Mc Moscovium (288) (Rn) 5f ¹⁴ 6d ¹⁰ 7s ² 7p ³	116 Lv Livermorium (293) (Rn) 5f ¹⁴ 6d ¹⁰ 7s ² 7p ⁴	117 Ts Tennessine (294) (Rn) 5f ¹⁴ 6d ¹⁰ 7s ² 7p ⁵	118 Og Oganesson (294) (Rn) 5f ¹⁴ 6d ¹⁰ 7s ² 7p ⁶
Actinoid Series		Lanthanoid Series															
		58 Ce Cerium 140.12 (Xe) 4f ¹ 5d ¹ 6s ²	59 Pr Praseodymium 140.907 (Xe) 4f ³ 6s ²	60 Nd Neodymium 144.24 (Xe) 4f ⁴ 6s ²	61 Pm Promethium (145) (Xe) 4f ⁵ 6s ²	62 Sm Samarium 150.36 (Xe) 4f ⁶ 6s ²	63 Eu Europium 151.964 (Xe) 4f ⁷ 6s ²	64 Gd Gadolinium 157.25 (Xe) 4f ⁷ 5d ¹ 6s ²	65 Tb Terbium 158.925 (Xe) 4f ⁹ 6s ²	66 Dy Dysprosium 162.50 (Xe) 4f ¹⁰ 6s ²	67 Ho Holmium 164.930 (Xe) 4f ¹¹ 6s ²	68 Er Erbium 167.259 (Xe) 4f ¹² 6s ²	69 Tm Thulium 168.934 (Xe) 4f ¹³ 6s ²	70 Yb Ytterbium 173.054 (Xe) 4f ¹⁴ 6s ²	71 Lu Lutetium 174.97 (Xe) 4f ¹⁴ 5d ¹ 6s ²		
		90 Th Thorium 232.038 (Rn) 6d ² 7s ²	91 Pa Protactinium 231.035 (Rn) 5f ² 6d ¹ 7s ²	92 U Uranium 238.028 (Rn) 5f ³ 6d ¹ 7s ²	93 Np Neptunium (237) (Rn) 5f ⁴ 6d ¹ 7s ²	94 Pu Plutonium (244) (Rn) 5f ⁶ 7s ²	95 Am Americium (243) (Rn) 5f ⁷ 7s ²	96 Cm Curium (247) 5f ⁷ 6d ¹ 7s ²	97 Bk Berkelium (247) (Rn) 5f ⁹ 7s ²	98 Cf Californium (251) (Rn) 5f ¹⁰ 7s ²	99 Es Einsteinium (252) (Rn) 5f ¹¹ 7s ²	100 Fm Fermium (257) (Rn) 5f ¹² 7s ²	101 Md Mendelevium (258) (Rn) 5f ¹³ 7s ²	102 No Nobelium (259) (Rn) 5f ¹⁴ 7s ²	103 Lr Lawrencium (262) (Rn) 5f ¹⁴ 6d ¹ 7s ²		
+1 Ions ammonium NH ₄ ⁺ hydronium (H ⁺)H ₃ O ⁺																	

Polyatomic Ion List	
<u>-1 Ions</u>	
acetate	$\text{C}_2\text{H}_3\text{O}_2^{-1}$
bicarbonate*	HCO_3^{-1}
(hydrogen carbonate)	
bisulfate*	HSO_4^{-1}
(hydrogen sulfate)	
hypobromite	BrO^{-1}
bromite	BrO_2^{-1}
bromate	BrO_3^{-1}
perbromate	BrO_4^{-1}
chlorite	ClO_2^{-1}
chlorate	ClO_3^{-1}
<u>cyanide</u>	CN^{-1}
<u>hydroxide</u>	OH^{-1}
iodate	IO_3^{-1}
nitrite	NO_2^{-1}
nitrate	NO_3^{-1}
perbromate	BrO_4^{-1}
perchlorate	ClO_4^{-1}
permanganate	MnO_4^{-1}
<u>-2 Ions</u>	
carbonate	CO_3^{-2}
chromate	CrO_4^{-2}
dichromate	$\text{Cr}_2\text{O}_7^{-2}$
oxalate	$\text{C}_2\text{O}_4^{-2}$
peroxide	O_2^{-2}
selenate	SeO_4^{-2}
sulfite	SO_3^{-2}
sulfate	SO_4^{-2}
tartrate	$\text{C}_4\text{H}_4\text{O}_6^{-2}$
thiosulfate	$\text{S}_2\text{O}_3^{-2}$
<u>-3 Ions</u>	
arsenate	AsO_4^{-3}
phosphite	PO_3^{-3}
phosphate	PO_4^{-3}
<u>-4 Ion</u>	
pyrophosphate	$\text{P}_2\text{O}_7^{-4}$

Updated: 8/18/2022

Element	Sym	#	Element	Sym	#	Element	Sym	#
actinium	Ac	89	hafnium	Hf	72	praseodymium	Pr	59
aluminum	Al	13	hassium	Hs	108	promethium	Pm	61
americium	Am	95	helium	He	2	protactinium	Pa	91
antimony	Sb	51	holmium	Ho	67	radium	Ra	88
argon	Ar	18	hydrogen	H	1	radon	Rn	86
arsenic	As	33	indium	In	49	rhodium	Rh	45
astatine	At	85	iodine	I	53	roentgenium	Rg	111
barium	Ba	56	iridium	Ir	77	rubidium	Rb	37
berkelium	Bk	97	iron	Fe	26	ruthenium	Ru	44
beryllium	Be	4	krypton	Kr	36	rutherfordium	Rf	104
bismuth	Bi	83	lanthanum	La	57	samarium	Sm	62
bohrium	Bh	107	lawrencium	Lr	103	scandium	Sc	21
boron	B	5	lead	Pb	82	seaborgium	Sg	106
bromine	Br	35	lithium	Li	3	selenium	Se	34
cadmium	Cd	48	livermorium	Lv	116	silicon	Si	14
calcium	Ca	20	lutetium	Lu	71	silver	Ag	47
californium	Cf	98	magnesium	Mg	12	sodium	Na	11
carbon	C	6	manganese	Mn	25	strontium	Sr	38
cerium	Ce	58	meitnerium	Mt	109	sulfur	S	16
cesium	Cs	55	mendelevium	Md	101	tantalum	Ta	73
chlorine	Cl	17	mercury	Hg	80	technetium	Tc	43
chromium	Cr	24	molybdenum	Mo	42	tellurium	Te	52
cobalt	Co	27	moscovium	Mc	115	tennessine	Ts	117
copernicium	Cn	112	neodymium	Nd	60	terbium	Tb	65
copper	Cu	29	neon	Ne	10	thallium	Tl	81
curium	Cm	96	neptunium	Np	93	thorium	Th	90
darmstadtium	Ds	110	nickel	Ni	28	thulium	Tm	69
dubnium	Db	105	nihonium	Nh	113	tin	Sn	50
dysprosium	Dy	66	niobium	Nb	41	titanium	Ti	22
einsteinium	Es	99	nitrogen	N	7	tungsten	W	74
erbium	Er	68	nobelium	No	102	uranium	U	92
europium	Eu	63	oganesson	Og	118	vanadium	V	23
fermium	Fm	100	osmium	Os	76	xenon	Xe	54
flerovium	Fl	114	oxygen	O	8	ytterbium	Yb	70
fluorine	F	9	palladium	Pd	46	yttrium	Y	39
francium	Fr	87	phosphorus	P	15	zinc	Zn	30
gadolinium	Gd	64	platinum	Pt	78	zirconium	Zr	40
gallium	Ga	31	plutonium	Pu	94			
germanium	Ge	32	polonium	Po	84			
gold	Au	79	potassium	K	19			

Single Replacement Activity Series

Metals and H	Non-metals (Halogens)
K Ca Na Mg Al Zn Fe Ni Sn Pb H Cu Ag Hg Au	F ₂ Cl ₂ Br ₂ I ₂

↑ Increasing Activity

Double Replacement

Solubility Chart: For any compound not listed or ---, assume (aq).

	C ₂ H ₃ O ₂	CO ₃ ²⁻	Cl ⁻	CrO ₄ ²⁻	OH ⁻	I ⁻	NO ₃ ⁻	C ₂ O ₄ ²⁻	O ²⁻	PO ₄ ³⁻	SO ₄ ²⁻	S ²⁻	SO ₃ ²⁻
Group 1 ⁺ & NH ₄ ⁺	(aq)	(aq)	(aq)	(aq)	(aq)	(aq)	(aq)	(aq)	(aq)	(aq)	(aq)	(aq)*	(aq)
Al ³⁺	(aq)	---	(aq)	---	(s)	(aq)	(aq)	---	(s)	(s)	(aq)	(aq)	(s)
Ba ²⁺	(aq)	(s)	(aq)	(s)	(aq)	(aq)	(aq)	(s)	(aq)	(s)	(aq)	(aq)	(s)
Bi ³⁺	---	(s)	(aq)	---	(s)	(s)	(aq)	(s)	(s)	(aq)	(s)	(s)	(s)
Ca ²⁺	(aq)	(s)	(aq)	(aq)	(aq)	(aq)	(aq)	(s)	(s)	(aq)	(aq)	(s)	(s)
Co ²⁺ Ni ²⁺ Cu ²⁺	(aq)	(s)	(aq)	(s)	(s)	(aq)	(aq)	(s)	(s)	(s)	(aq)	(s)	(s)
Fe ²⁺	(aq)	(s)	(aq)	---	(s)	(aq)	(aq)	(s)	(s)	(s)	(aq)	(s)	(s)
Fe ³⁺	(s)	---	(aq)	---	(s)	(aq)	(aq)	(aq)	(s)	(s)	(aq)	(s)	(s)
Pb ²⁺	(aq)	(s)	(s)	(s)	(s)	(s)	(aq)	(s)	(s)	(s)	(aq)	(s)	(s)
Mg ²⁺	(aq)	(s)	(aq)	(aq)	(s)	(aq)	(aq)	(s)	(s)	(s)	(aq)	(s)	(s)
Hg ²⁺	(aq)	(s)	(aq)	(aq)	(s)	(s)	(aq)	(s)	(s)	(s)	(aq)	(s)	(s)
Ag ⁺	(aq)	(s)	(s)	(s)	(s)	(s)	(aq)	(s)	(s)	(s)	(aq)	(s)	(s)
Zn ²⁺	(aq)	(s)	(aq)	(s)	(s)	(aq)	(aq)	(s)	(s)	(s)	(aq)	(s)	(s)
Mn ²⁺	(aq)	(aq)	(aq)	---	(s)	(aq)	(aq)	(s)	(s)	(s)	(aq)	(s)	(s)
Cr ³⁺	(aq)	---	(aq)	---	---	(aq)	(aq)	(s)	(s)	(s)	(aq)	(s)	(s)

* H₂S_(g), HCN_(g), CO_{2(g)}