

Table I-1a. Periodic Table.

Period	Group																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	1A	2A	3B	4B	5B	6B	7B	8B			1B	2B	3A	4A	5A	6A	7A	8A
	s-block		d-block										p-block					
1	1 H																	2 He
2	3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
3	11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba	*57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
7	87 Fr	88 Ra	#89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110	111	112						
Lanthanides			*57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	
Actinides			#89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	
f-block																		

Table I-1b. Some atomic properties of the elements.

Z	Sym -bol	Name	Atomic weight	Electron configuration	Oxidation states	Density (g/cm ³)	Melting point (K)	Boiling point (K)
1	H	Hydrogen	1.00794	1s ¹	1	(0.0899)	14.0	20.28
2	He	Helium	4.00260	1s ²		(0.1785)	0.95	4.216
3	Li	Lithium	6.941	1s ² 2s ¹	1	0.53	453.7	1615
4	Be	Beryllium	9.01218	1s ² 2s ²	2	1.85	1560	2757
5	B	Boron	10.81	1s ² 2s ² p ¹	3	2.34	2365	4275
6	C	Carbon	12.011	1s ² 2s ² p ²	2, ±4	2.26	3825	5100
7	N	Nitrogen	14.0067	1s ² 2s ² p ³	2, ±3,4,5	(1.251)	63.15	77.35
8	O	Oxygen	15.9994	1s ² 2s ² p ⁴	-2	(1.429)	54.8	90.18
9	F	Fluorine	18.9984	1s ² 2s ² p ⁵	-1	(1.696)	53.5	85
10	Ne	Neon	20.1797	1s ² 2s ² p ⁶		(0.90)	24.55	27.1
11	Na	Sodium	22.98977	[Ne]3s ¹	1	0.97	371.0	1156
12	Mg	Magnesium	24.305	[Ne]3s ²	2	1.74	922	1380
13	Al	Aluminum	26.98154	[Ne]3s ² p ¹	3	2.70	933.5	2740
14	Si	Silicon	28.0855	[Ne]3s ² p ²	4	2.33	1683	3522
15	P	Phosphorus	30.97376	[Ne]3s ² p ³	±3,4,5	1.82	317.3	553
16	S	Sulfur	32.066	[Ne]3s ² p ⁴	±2,4,6	2.07	392.2	717.8
17	Cl	Chlorine	35.4527	[Ne]3s ² p ⁵	±1,3,5,7	(3.214)	172.2	239.1
18	Ar	Argon	39.948	[Ne]3s ² p ⁶		(1.784)	83.9	87.4
19	K	Potassium	39.0983	[Ar]4s ¹	1	0.86	336.8	1033
20	Ca	Calcium	40.078	[Ar]4s ²	2	1.55	1112	1757
21	Sc	Scandium	44.9559	[Ar]3d ¹ 4s ²	3	2.99	1814	3109
22	Ti	Titanium	47.88	[Ar]3d ² 4s ²	3,4	4.54	1945	3560
23	V	Vanadium	50.9415	[Ar]3d ³ 4s ²	2,3,4,5	6.11	2163	3650
24	Cr	Chromium	51.996	[Ar]3d ⁵ 4s ¹	2,3,6	7.19	2130	2945
25	Mn	Manganese	54.9380	[Ar]3d ⁵ 4s ²	2,3,4,6,7	7.44	1518	2335
26	Fe	Iron	55.847	[Ar]3d ⁶ 4s ²	2,3	7.874	1808	3135
27	Co	Cobalt	58.9332	[Ar]3d ⁷ 4s ²	2,3	8.90	1768	3143
28	Ni	Nickel	58.6934	[Ar]3d ⁸ 4s ²	2,3	8.90	1726	3187
29	Cu	Copper	63.546	[Ar]3d ¹⁰ 4s ¹	1,2	8.96	1357	2840
30	Zn	Zinc	65.39	[Ar]3d ¹⁰ 4s ²	2	7.13	692.7	1180
31	Ga	Gallium	69.723	[Ar]3d ¹⁰ 4s ² p ¹	3	5.91	302.9	2478
32	Ge	Germanium	72.61	[Ar]3d ¹⁰ 4s ² p ²	4	5.32	1211	3107
33	As	Arsenic	74.9216	[Ar]3d ¹⁰ 4s ² p ³	±3,5	5.78	1090	876
34	Se	Selenium	78.96	[Ar]3d ¹⁰ 4s ² p ⁴	-2,4,6	4.79	494	958
35	Br	Bromine	79.904	[Ar]3d ¹⁰ 4s ² p ⁵	±1,5	3.12	265.9	332
36	Kr	Krypton	83.80	[Ar]3d ¹⁰ 4s ² p ⁶		(3.75)	116	120
37	Rb	Rubidium	85.4678	[Kr]5s ¹	1	1.532	312.6	961
38	Sr	Strontium	87.62	[Kr]5s ²	2	2.54	1042	1655
39	Y	Yttrium	88.9059	[Kr]4d ¹ 5s ²	3	4.47	1795	3611
40	Zr	Zirconium	91.224	[Kr]4d ² 5s ²	4	6.51	2128	4682
41	Nb	Niobium	92.9064	[Kr]4d ⁴ 5s ¹	3,5	8.57	2742	5015
42	Mo	Molybdenum	95.94	[Kr]4d ⁵ 5s ¹	2,3,4,5,6	10.22	2896	4912
43	Tc*	Technetium	98	[Kr]4d ⁵ 5s ²	7	11.5	2477	4538
44	Ru	Ruthenium	101.07	[Kr]4d ⁷ 5s ¹	2,3,4,6,8	12.37	2523	4425
45	Rh	Rhodium	102.9055	[Kr]4d ⁸ 5s ¹	2,3,4	12.41	2236	3970
46	Pd	Palladium	106.42	[Kr]4d ¹⁰ 5s ⁰	2,4	12.0	1825	3240
47	Ag	Silver	107.868	[Kr]4d ¹⁰ 5s ¹	1	10.5	1235	2436
48	Cd	Cadmium	112.41	[Kr]4d ¹⁰ 5s ²	2	8.65	594.2	1040

Z	Sym -bol	Name	Atomic weight	Electron configuration	Oxidation states	Density (g/cm ³)	Melting point (K)	Boiling point (K)
49	In	Indium	114.82	[Kr]4d ¹⁰ 5s ² p ¹	3	7.31	429.7	2350
50	Sn	Tin	118.71	[Kr]4d ¹⁰ 5s ² p ²	2,4	7.31	505.1	2876
51	Sb	Antimony	121.757	[Kr]4d ¹⁰ 5s ² p ³	±3,5	6.69	904	1860
52	Te	Tellurium	127.60	[Kr]4d ¹⁰ 5s ² p ⁴	-2,4,6	6.24	722.7	1261
53	I	Iodine	126.9045	[Kr]4d ¹⁰ 5s ² p ⁵	±1,5,7	4.93	386.7	457.5
54	Xe	Xenon	131.29	[Kr]4d ¹⁰ 5s ² p ⁶		(5.90)	161.4	165.1
55	Cs	Cesium	132.9054	[Xe]6s ¹	1	1.87	301.5	944
56	Ba	Barium	137.33	[Xe]6s ²	2	3.59	1002	2078
57	La	Lanthanum	138.9055	[Xe]5d ¹ 6s ²	3	6.15	1193	3737
58	Ce	Cerium	140.12	[Xe]4f ¹ 5d ¹ 6s ²	3,4	6.77	1071	3715
59	Pr	Praseodymium	140.9077	[Xe]4f ³ 6s ²	3,4	6.77	1204	3785
60	Nd	Neodymium	144.24	[Xe]4f ⁴ 6s ²	3	7.01	1294	3347
61	Pm*	Promethium	145	[Xe]4f ⁵ 6s ²	3	7.22	1315	3273
62	Sm	Samarium	150.36	[Xe]4f ⁶ 6s ²	2,3	7.52	1345	2064
63	Eu	Europium	151.965	[Xe]4f ⁷ 6s ²	2,3	5.24	1090	1870
64	Gd	Gadolinium	157.25	[Xe]4f ⁸ 6s ²	3	7.9	1585	3539
65	Tb	Terbium	158.9253	[Xe]4f ⁹ 6s ²	3,4	8.23	1630	3496
66	Dy	Dysprosium	162.50	[Xe]4f ¹⁰ 6s ²	3	8.55	1682	2835
67	Ho	Holmium	164.9303	[Xe]4f ¹¹ 6s ²	3	8.80	1743	2968
68	Er	Erbium	167.26	[Xe]4f ¹² 6s ²	3	9.07	1795	3136
69	Tm	Thulium	168.9342	[Xe]4f ¹³ 6s ²	2,3	9.32	1818	2220
70	Yb	Ytterbium	173.04	[Xe]4f ¹⁴ 6s ²	2,3	6.97	1097	1467
71	Lu	Lutetium	174.967	[Xe]4f ¹⁴ 5d ¹ 6s ²	3	9.84	1936	3668
72	Hf	Hafnium	178.49	[Xe]4f ¹⁴ 5d ² 6s ²	4	13.31	2504	4875
73	Ta	Tantalum	180.9479	[Xe]4f ¹⁴ 5d ³ 6s ²	5	16.65	3293	5730
74	W	Tungsten	183.85	[Xe]4f ¹⁴ 5d ⁴ 6s ²	2,3,4,5,6	19.3	3680	5828
75	Re	Rhenium	186.207	[Xe]4f ¹⁴ 5d ⁵ 6s ²	-1,2,4,6,7	21.0	3455	5870
76	Os	Osmium	190.2	[Xe]4f ¹⁴ 5d ⁶ 6s ²	2,3,4,6,8	22.6	3300	5300
77	Ir	Iridium	192.22	[Xe]4f ¹⁴ 5d ⁷ 6s ²	2,3,4,6	22.6	2720	4700
78	Pt	Platinum	195.08	[Xe]4f ¹⁴ 5d ⁹ 6s ¹	2,4	21.45	2042	4100
79	Au	Gold	196.9665	[Xe]4f ¹⁴ 5d ¹⁰ 6s ¹	1,3	18.88	1337	3130
80	Hg	Mercury	200.59	[Xe]4f ¹⁴ 5d ¹⁰ 6s ²	1,2	13.55	234.3	630
81	Tl	Thallium	204.383	[Xe]4f ¹⁴ 5d ¹⁰ 6s ² p ¹	1,3	11.85	577	1746
82	Pb	Lead	207.2	[Xe]4f ¹⁴ 5d ¹⁰ 6s ² p ²	2,4	11.35	600.6	2023
83	Bi	Bismuth	208.9804	[Xe]4f ¹⁴ 5d ¹⁰ 6s ² p ³	3,5	9.75	544.5	1837
84	Po	Polonium	209	[Xe]4f ¹⁴ 5d ¹⁰ 6s ² p ⁴	2,4	9.3	527	1235
85	At	Astatine	210	[Xe]4f ¹⁴ 5d ¹⁰ 6s ² p ⁵	±1,3,5,7		575	610
86	Rn	Radon	222	[Xe]4f ¹⁴ 5d ¹⁰ 6s ² p ⁶		(9.73)	202	211
87	Fr	Francium	223	[Rn]7s ¹	1		300	950
88	Ra	Radium	226.0254	[Rn]7s ²	2	5	973	1900
89	Ac	Actinium	227.0278	[Rn]6d ¹ 7s ²	3	10.07	1324	3470
90	Th	Thorium	232.0381	[Rn]6d ² 7s ²	4	11.72	2028	5061
91	Pa	Protactinium	231.0359	[Rn]5f ² 6d ¹ 7s ²	4,5	15.4	1845	4300
92	U	Uranium	238.029	[Rn]5f ³ 6d ¹ 7s ²	3,4,5,6	18.95	1408	4407
93	Np*	Neptunium	237.0482	[Rn]5f ⁴ 6d ¹ 7s ²	3,4,5,6	20.2	912	4175
94	Pu*	Plutonium	244	[Rn]5f ⁶ 7s ²	3,4,5,6	19.84	913	3505
95	Am*	Americium	243	[Rn]5f ⁷ 7s ²	3,4,5,6	13.7	1449	2880
96	Cm*	Curium	247	[Rn]5f ⁷ 6d ¹ 7s ²	3	13.5	1620	

Z	Sym -bol	Name	Atomic weight	Electron configuration	Oxidation states	Density (g/cm ³)	Melting point (K)	Boiling point (K)
97	Bk*	Berkelium	247	[Rn]5f ⁹ 7s ²	3,4			
98	Cf*	Californium	251	[Rn]5f ¹⁰ 7s ²	3		1170	
99	Es*	Einsteinium	252	[Rn]5f ¹¹ 7s ²			1130	
100	Fm*	Fermium	257	[Rn]5f ¹² 7s ²			1800	
101	Md*	Mendelevium	258	[Rn]5f ¹³ 7s ²			1100	
102	No*	Nobelium	259	[Rn]5f ¹⁴ 7s ²			1100	
103	Lr*	Lawrencium	260	[Rn]5f ¹⁴ 6d ¹ 7s ²			1900	
104	Rf*	Rutherfordium	261	[Rn]5f ¹⁴ 6d ² 7s ²				
105	Db*	Dubnium	262	[Rn]5f ¹⁴ 6d ³ 7s ²				
106	Sg*	Seaborgium	263	[Rn]5f ¹⁴ 6d ⁴ 7s ²				
107	Bh*	Bohrium	262	[Rn]5f ¹⁴ 6d ⁵ 7s ²				
108	Hs*	Hassium	265	[Rn]5f ¹⁴ 6d ⁶ 7s ²				
109	Mt*	Meitnerium	266	[Rn]5f ¹⁴ 6d ⁷ 7s ²				
110	Uun*	Ununnilium	269	[Rn]5f ¹⁴ 6d ⁹ 7s ¹				
111	Uuu*	Unununium	272	[Rn]5f ¹⁴ 6d ¹⁰ 7s ¹				
112	Uub*	Ununbium	277	[Rn]5f ¹⁴ 6d ¹⁰ 7s ²				

Note: Density is at 300 K and one atmosphere, except those in parenthesis, which are in gaseous state, are in unit of g/L. The bold numbers are the most common oxidation states for a given element. Elements with asterisk are artificial radionuclides.