Periodic Table of the Elements

MAIN-GROUP ELEMENTS

Atomic number
Electronegativity
First ionization energy (kJ/mol)
Melting point (K)
Boiling point (K)

6 | 12.01 | Average atomic mass*
2.5 | 2+ 4+ | Common ion charge
1086 | Other ion charges
4765
4098
C
carbon

Gases
Liquids
Synthetics

metals (main group)
metals (transition)
metals (inner transition)
metalloids
nonmetals

TRANSITION ELEMENTS

	1 (IA)	2 (IIA)	3 (IIIB)	4 (IVB)	5 (VB)	6 (VIB)	7 (VIIB)	8	9 (VIIIB)
1	1 1.01 2.20 1+ 1312 1- 13.81 20.28 H hydrogen								
2	3 6.94 0.98 1+ 520 453.7 1615 Li lithium	4 9.01 1.57 2+ 899 1560 2744 Be beryllium							
3	11 22.99 0.93 1+ 496 371 1156 Na sodium	12 24.31 1.31 2+ 738 923.2 1363 Mg magnesium							
4	19 39.10 0.82 1+ 419 336.7 1032 K potassium	20 40.08 1.00 2+ 590 1115 1757 Ca calcium	21 44.96 1.36 3+ 631 1814 3109 Sc scandium	22 47.87 1.54 4+ 658 2+ 1941 3+ 3560 Ti titanium	23 50.94 1.63 5+ 650 2+ 2183 3+ 3680 4+ V vanadium	24 52.00 1.66 3+ 653 2+ 2180 6+ 2944 Cr chromium	25 54.94 1.55 4+ 717 2+ 1519 3+ 2334 7+ Mn manganese	26 55.85 1.83 3+ 759 2+ 1811 3134 Fe iron	27 58.93 1.88 2+ 760 3+ 1768 3200 Co cobalt
5	37 85.47 0.82 1+ 403 312.5 941.2 Rb rubidium	38 87.62 0.95 2+ 549 1050 1655 Sr strontium	39 88.91 1.22 3+ 616 1795 3618 Y yttrium	40 91.22 1.33 4+ 660 2128 4682 Zr zirconium	41 92.91 1.6 5+ 664 3+ 2750 5017 Nb niobium	42 95.94 2.16 6+ 685 2896 4912 Mo molybdenum	43 (98) 2.10 7+ 702 4+ 2430 6+ 4538 Tc technetium	44 101.07 2.2 3+ 711 2607 4423 Ru ruthenium	45 102.91 2.28 3+ 720 2237 3968 Rh rhodium
6	55 132.91 0.79 1+ 376 301.7 944 Cs cesium	56 137.33 0.89 2+ 503 1000 2170 Ba barium	57 138.91 1.10 3+ 538 1191 3737 La lanthanum	72 178.49 1.3 4+ 642 2506 4876 Hf hafnium	73 180.95 1.5 5+ 761 3290 5731 Ta tantalum	74 183.84 1.7 6+ 770 3695 5828 W tungsten	75 186.21 1.9 4+ 760 6+ 3459 7+ 5869 Re rhenium	76 190.23 2.2 4+ 840 3+ 3306 5285 Os osmium	77 192.22 2.2 4+ 880 3+ 2719 4701 Ir iridium
7	87 (223) 0.7 1+ ~375 300.2 – Fr francium	88 (226) 0.9 2+ 509 973.2 – Ra radium	89 (227) 1.1 3+ 499 1324 3471 Ac actinium	104 (261) – 4+ – – – Rf rutherfordium	105 (262) – – – – – Db dubnium	106 (266) – – – – – Sg seaborgium	107 (264) – – – – – Bh bohrium	108 (265) – – – – – Hs hassium	109 (268) – – – – – Mt meitnerium

INNER TRANSITION ELEMENTS

6	Lanthanoids	58 140.12 1.12 3+ 4+ 527 1071 3716 Ce cerium	59 140.91 1.13 3+ 523 1204 3793 Pr praseodymium	60 144.24 1.14 3+ 530 1294 3347 Nd neodymium	61 (145) – 3+ 536 1315 3273 Pm promethium	62 150.36 1.17 3+ 543 2+ 1347 2067 Sm samarium	63 151.96 – 3+ 547 2+ 1095 1802 Eu europium	64 157.25 1.20 3+ 593 1586 3546 Gd gadolinium
7	Actinoids	90 232.04 1.3 4+ 587 2023 5061 Th thorium	91 231.04 1.5 5+ 4+ 568 1845 – Pa protactinium	92 238.03 1.7 6+ 3+ 584 4+ 1408 5+ 4404 U uranium	93 237.05 1.3 5+ 3+ 597 4+ 917 6+ – Np neptunium	94 (244) 1.3 4+ 585 3+ 913.2 5+ 3501 6+ Pu plutonium	95 (243) – 3+ 4+ 578 5+ 1449 6+ 2284 Am americium	96 (247) – 3+ 581 1618 3373 Cm curium

*Average atomic mass data in brackets indicate atomic mass of most stable isotope of the element.
Data obtained from *The CRC Handbook of Chemistry and Physics*, 81st Edition

MAIN-GROUP ELEMENTS

10	11 (IB)	12 (IIB)	13 (IIIA)	14 (IVA)	15 (VA)	16 (VIA)	17 (VIIA)	18 (VIIIA)
								2 4.00 – – 2372 5.19 He 5.02 helium
			5 10.81 2.04 – 800 2348 B 4273 boron	6 12.01 2.55 – 1086 4765 C 4098 carbon	7 14.01 3.04 3– 1402 63.15 N 77.36 nitrogen	8 16.00 3.44 2– 1314 54.36 O 90.2 oxygen	9 19.00 3.98 1– 1681 53.48 F 84.88 fluorine	10 20.18 – – 2080 24.56 Ne 27.07 neon
			13 26.98 1.61 3+ 577 933.5 Al 2792 aluminum	14 28.09 1.90 – 786 1687 Si 3538 silicon	15 30.97 2.19 – 1012 317.3 P 553.7 phosphorus	16 32.07 2.58 2– 999 392.8 S 717.8 sulfur	17 35.45 3.16 1– 1256 171.7 Cl 239.1 chlorine	18 39.95 – – 1520 83.8 Ar 87.3 argon
28 58.69 1.91 2+ 737 3+ 1728 Ni 3186 nickel	29 63.55 1.90 2+ 745 1+ 1358 Cu 2835 copper	30 65.39 1.65 2+ 906 692.7 Zn 1180 zinc	31 69.72 1.81 3+ 579 302.9 Ga 2477 gallium	32 72.61 2.01 – 761 1211 Ge 3106 germanium	33 74.92 2.18 – 947 1090 As 876.2 arsenic	34 78.96 2.55 2– 941 493.7 Se 958.2 selenium	35 79.90 2.96 1– 1143 266 Br 332 bromine	36 83.80 – – 1351 115.8 Kr 119.9 krypton
46 106.42 2.20 2+ 805 3+ 1828 Pd 3236 palladium	47 107.87 1.93 1+ 731 1235 Ag 2435 silver	48 112.41 1.69 2+ 868 594.2 Cd 1040 cadmium	49 114.82 1.78 3+ 558 429.8 In 3345 indium	50 118.71 1.96 4+ 708 2+ 505 Sn 2875 tin	51 121.76 2.05 – 834 903.8 Sb 1860 antimony	52 127.60 2.1 – 869 722.7 Te 1261 tellurium	53 126.90 2.66 1– 1009 386.9 I 457.4 iodine	54 131.29 – – 1170 161.4 Xe 165 xenon
78 195.08 2.2 4+ 870 2+ 2042 Pt 4098 platinum	79 196.97 2.4 3+ 890 1+ 1337 Au 3129 gold	80 200.59 1.9 2+ 1107 1+ 234.3 Hg 629.9 mercury	81 204.38 1.8 1+ 589 3+ 577.2 Tl 1746 thallium	82 207.20 1.8 2+ 715 4+ 600.6 Pb 2022 lead	83 208.98 1.9 3+ 703 5+ 544.6 Bi 1837 bismuth	84 (209) 2.0 4+ 813 2+ 527.2 Po 1235 polonium	85 (210) 2.2 1– (926) 575 At – astatine	86 (222) – – 1037 202.2 Rn 211.5 radon
110 (269) – – – – Uun – ununnilium	111 (272) – – – – Uuu – unununium	112 (277) – – – – Uub – ununbium		114 (285) – – – – Uuq – ununquadium		116 (289) – – – – Uuh – ununhexium		118 (293) – – – – Uuo – ununoctium

65 158.93 – 3+ 565 1629 Tb 3503 terbium	66 162.50 1.22 3+ 572 1685 Dy 2840 dysprosium	67 164.93 1.23 3+ 581 1747 Ho 2973 holmium	68 167.26 1.24 3+ 589 1802 Er 3141 erbium	69 168.93 1.25 3+ 597 1818 Tm 2223 thulium	70 173.04 – 3+ 603 2+ 1092 Yb 1469 ytterbium	71 174.97 1.0 3+ 524 1936 Lu 3675 lutetium
97 (247) – 3+ 601 4+ 1323 Bk – berkelium	98 (251) – 3+ 608 1173 Cf – californium	99 (252) – 3+ 619 1133 Es – einsteinium	100 (257) – 3+ 627 1800 Fm – fermium	101 (258) – 3+ 635 2+ 1100 Md – mendelevium	102 (259) – 3+ 642 2+ 1100 No – nobelium	103 (262) – 3+ – 1900 Lr – lawrencium