

# IUPAC Periodic Table of the Elements and Isotopes

hydrogen <b>H</b> 1 1.008 [1.007 84, 1.008 11]																	helium <b>He</b> 2 4.002 602(2)															
lithium <b>Li</b> 3 6.94 [6.938, 6.997]	beryllium <b>Be</b> 4 9.012 1831(5)																	boron <b>B</b> 5 10.81 [10.806, 10.821]	carbon <b>C</b> 6 12.011 [12.0096, 12.0116]	nitrogen <b>N</b> 7 14.007 [14.006 43, 14.007 28]	oxygen <b>O</b> 8 15.999 [15.999 03, 15.999 77]	fluorine <b>F</b> 9 18.998 403 163(6)	neon <b>Ne</b> 10 20.1797(6)									
sodium <b>Na</b> 11 22.989 769 28(2)	magnesium <b>Mg</b> 12 24.305 [24.304, 24.307]																	aluminium <b>Al</b> 13 26.981 5385(7)	silicon <b>Si</b> 14 28.085 [28.084, 28.086]	phosphorus <b>P</b> 15 30.973 761 998(5)	sulfur <b>S</b> 16 32.06 [32.059, 32.076]	chlorine <b>Cl</b> 17 35.45 [35.446, 35.457]	argon <b>Ar</b> 18 39.95 [39.792, 39.963]									
potassium <b>K</b> 19 39.0983(1)	calcium <b>Ca</b> 20 40.078(4)	scandium <b>Sc</b> 21 44.955 908(5)	titanium <b>Ti</b> 22 47.867(1)	vanadium <b>V</b> 23 50.9415(1)	chromium <b>Cr</b> 24 51.9961(6)	manganese <b>Mn</b> 25 54.938 043(2)	iron <b>Fe</b> 26 55.845(2)	cobalt <b>Co</b> 27 58.933 194(4)	nickel <b>Ni</b> 28 58.6934(4)	copper <b>Cu</b> 29 63.546(3)	zinc <b>Zn</b> 30 65.38(2)	gallium <b>Ga</b> 31 69.723(1)	germanium <b>Ge</b> 32 72.630(8)	arsenic <b>As</b> 33 74.921 595(6)	selenium <b>Se</b> 34 78.971(8)	bromine <b>Br</b> 35 79.904 [79.901, 79.907]	krypton <b>Kr</b> 36 83.798(2)															
rubidium <b>Rb</b> 37 85.4678(3)	strontium <b>Sr</b> 38 87.62(1)	yttrium <b>Y</b> 39 88.905 84(2)	zirconium <b>Zr</b> 40 91.224(2)	niobium <b>Nb</b> 41 92.906 37(2)	molybdenum <b>Mo</b> 42 95.95(1)	technetium <b>Tc</b> 43 ○	ruthenium <b>Ru</b> 44 101.07(2)	rhodium <b>Rh</b> 45 102.905 49(2)	palladium <b>Pd</b> 46 106.42(1)	silver <b>Ag</b> 47 107.8682(2)	cadmium <b>Cd</b> 48 112.414(4)	indium <b>In</b> 49 114.818(1)	tin <b>Sn</b> 50 118.710(7)	antimony <b>Sb</b> 51 121.760(1)	tellurium <b>Te</b> 52 127.60(3)	iodine <b>I</b> 53 126.904 47(3)	xenon <b>Xe</b> 54 131.293(6)															
caesium <b>Cs</b> 55 132.905 451 96(6)	barium <b>Ba</b> 56 137.327(7)																	hafnium <b>Hf</b> 72 178.49(2)	tantalum <b>Ta</b> 73 180.947 88(2)	tungsten <b>W</b> 74 183.84(1)	rhenium <b>Re</b> 75 186.207(1)	osmium <b>Os</b> 76 190.23(3)	iridium <b>Ir</b> 77 192.217(2)	platinum <b>Pt</b> 78 195.084(9)	gold <b>Au</b> 79 196.966 570(4)	mercury <b>Hg</b> 80 200.592(3)	thallium <b>Tl</b> 81 204.38 [204.382, 204.385]	lead <b>Pb</b> 82 207.2(1)	bismuth <b>Bi</b> 83 208.980 40(1)	polonium <b>Po</b> 84 ○	astatine <b>At</b> 85 ○	radon <b>Rn</b> 86 ○
francium <b>Fr</b> 87 ○	radium <b>Ra</b> 88 ○																	rutherfordium <b>Rf</b> 104 ○	bohrium <b>Bh</b> 107 ○	hassium <b>Hs</b> 108 ○	meitnerium <b>Mt</b> 109 ○	darmstadtium <b>Ds</b> 110 ○	roentgenium <b>Rg</b> 111 ○	copernicium <b>Cn</b> 112 ○	nihonium <b>Nh</b> 113 ○	flerovium <b>Fl</b> 114 ○	moscovium <b>Mc</b> 115 ○	livermorium <b>Lv</b> 116 ○	tennessine <b>Ts</b> 117 ○	oganeson <b>Og</b> 118 ○		

Element has two or more isotopes that are used to determine its atomic weight. Variations are well known, and the standard atomic weight is given as lower and upper bounds within square brackets, [ ].

Element has two or more isotopes that are used to determine its standard atomic weight. The isotopic abundance and atomic weights vary in normal materials, but upper and lower bounds of the standard atomic weight have not been assigned by IUPAC.

Element has only one isotope that is used to determine its standard atomic weight. Thus, the standard atomic weight is invariant and is given as a single value with an IUPAC evaluated uncertainty.

Element has no standard atomic weight because all of its isotopes are radioactive and, in normal materials, no isotope occurs with a characteristic isotopic abundance from which a standard atomic weight can be determined.



lanthanum <b>La</b> 57 138.905 47(7)	cerium <b>Ce</b> 58 140.116(1)	praseodymium <b>Pr</b> 59 140.907 66(1)	neodymium <b>Nd</b> 60 144.242(3)	promethium <b>Pm</b> 61 ○	samarium <b>Sm</b> 62 150.36(2)	europium <b>Eu</b> 63 151.964(1)	gadolinium <b>Gd</b> 64 157.25(3)	terbium <b>Tb</b> 65 158.925 354(8)	dysprosium <b>Dy</b> 66 162.500(1)	holmium <b>Ho</b> 67 164.930 328(7)	erbium <b>Er</b> 68 167.259(3)	thulium <b>Tm</b> 69 168.934 218(6)	ytterbium <b>Yb</b> 70 173.045(10)	lutetium <b>Lu</b> 71 174.9668(1)
actinium <b>Ac</b> 89 ○	thorium <b>Th</b> 90 232.0377(4)	protactinium <b>Pa</b> 91 231.036 88(1)	uranium <b>U</b> 92 238.028 91(3)	neptunium <b>Np</b> 93 ○	plutonium <b>Pu</b> 94 ○	americium <b>Am</b> 95 ○	curium <b>Cm</b> 96 ○	berkelium <b>Bk</b> 97 ○	californium <b>Cf</b> 98 ○	einsteinium <b>Es</b> 99 ○	fermium <b>Fm</b> 100 ○	mendelevium <b>Md</b> 101 ○	nobelium <b>No</b> 102 ○	lawrencium <b>Lr</b> 103 ○

Standard atomic weights are the best estimates by IUPAC of atomic weights that are found in normal materials, which are terrestrial materials that are reasonably possible sources for elements and their compounds in commerce, industry, or science. They are determined using all stable isotopes and selected radioactive isotopes (having relatively long half-lives and characteristic terrestrial isotopic compositions). Isotopes are considered stable (non-radioactive) if evidence for radioactive decay has not been detected experimentally.

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