Table 5 Standard atomic weights 2009 abridged to five significant digits.
[Using $A_r(^{12}C) = 12$ as reference, where ^{12}C is an unbound neutral atom in its nuclear and electronic ground state.]

The atomic weights, $A_r(E)$, of many elements vary due to variations in the abundances of their isotopes in natural terrestrial materials. For 10 elements having two or more stable isotopes, an atomic-weight interval is given with the symbol [*a*; *b*] to denote the set of atomic-weight values in normal materials; thus, $a \le A_r(E) \le b$ for element E. The symbols *a* and *b* denote the lower and upper bounds of the interval [*a*; *b*], respectively. Atomic weights are quoted here to five significant figures unless the dependable accuracy is further limited by either the combined uncertainties of the best published atomic-weight determinations or by the variability of isotopic composition in normal terrestrial occurrences (the latter applies to the elements annotated r). Excluding values given as atomic-weight intervals, the last significant figure of each tabulated value is considered reliable to ±1 except when a larger single digit uncertainty is inserted in parentheses following the atomic weight. Neither the highest nor the lowest actual atomic weight of any normal sample is thought likely to differ from the tabulated values by more than one assigned uncertainty. However, the tabulated values do not apply either to samples of highly exceptional isotopic composition arising from most unusual geological occurrences (for elements annotated g) or to those whose isotopic composition has been artificially altered. Such might even be found in commerce without disclosure of that modification (for elements annotated m). Elements with no stable isotope do not have an atomic weight, and such entries have a blank in the atomic-weight column. However, three such elements (Th, Pa and U) do have a characteristic terrestrial isotopic composition and for these an atomic-weight value is tabulated. For more detailed information, users should refer to the full IUPAC Table of Standard Atomic Weights. Names of elements with atomic number 113 to 118 are provisional.

Order of atomic number				
Atomic number	Element name	Symbol	Atomic weight	Footnotes
1	hydrogen	H	[1.0078; 1.0082]	m
2	helium	He	4.0026	
3	lithium	Li	[6.938; 6.997]	m
4	beryllium	Be	9.0122	
5	boron	B	[10.806; 10.821]	m
6	carbon	C	[12.009; 12.012]	
7	nitrogen	N	[14.006; 14.008]	
8	oxygen	O	[15.999; 16.000]	
9	fluorine	F	18.998	
10	neon	Ne	20.180	m
11	sodium	Na	22.990	
12	magnesium	Mg	24.305	
13	aluminium (aluminum)	Al	26.982	
14	silicon	Si	[28.084; 28.086]	
15	phosphorus	P	30.974	
16	sulfur	S	[32.059; 32.076]	
17	chlorine	Cl	[35.446; 35.457]	m
18	argon	Ar	39.948	g r
19	potassium	K	39.098	g
20	calcium	Ca	40.078(4)	g
21	scandium	Sc	44.956	

(*continues on next page*)

Table 5 (*Continued*).

Order of atomic number				
Atomic number	Element name	Symbol	Atomic weight	Footnotes
22	titanium	Ti	47.867	
23	vanadium	V	50.942	
24	chromium	Cr	51.996	
25	manganese	Mn	54.938	
26	iron	Fe	55.845(2)	
27	cobalt	Co	58.933	
28	nickel	Ni	58.693	r
29	copper	Cu	63.546(3)	r
30	zinc	Zn	65.38(2)	r
31	gallium	Ga	69.723	
32	germanium	Ge	72.63	
33	arsenic	As	74.922	
34	selenium	Se	78.96(3)	r
35	bromine	Br	79.904	
36	krypton	Kr	83.798(2)	g m
37	rubidium	Rb	85.468	
38	strontium	Sr	87.62	g r
39	yttrium	Y	88.906	
40	zirconium	Zr	91.224(2)	g
41	niobium	Nb	92.906(2)	
42	molybdenum	Mo	95.96(2)	g
43	technetium*	Tc		
44	ruthenium	Ru	101.07(2)	g
45	rhodium	Rh	102.91	
46	palladium	Pd	106.42	g
47	silver	Ag	107.87	g
48	cadmium	Cd	112.41	
49	indium	In	114.82	
50	tin	Sn	118.71	
51	antimony	Sb	121.76	g
52	tellurium	Te	127.60(3)	g
53	iodine	I	126.90	
54	xenon	Xe	131.29	g m
55	caesium (cesium)	Cs	132.91	
56	barium	Ba	137.33	
57	lanthanum	La	138.91	
58	cerium	Ce	140.12	g
59	praseodymium	Pr	140.91	
60	neodymium	Nd	144.24	g
61	promethium*	Pm		
62	samarium	Sm	150.36(2)	g
63	europium	Eu	151.96	g
64	gadolinium	Gd	157.25(3)	g
65	terbium	Tb	158.93	
66	dysprosium	Dy	162.50	g
67	holmium	Ho	164.93	

(*continues on next page*)

Table 5 (*Continued*).

Order of atomic number				
Atomic number	Element name	Symbol	Atomic weight	Footnotes
68	erbium	Er	167.26	g
69	thulium	Tm	168.93	
70	ytterbium	Yb	173.05	g
71	lutetium	Lu	174.97	g
72	hafnium	Hf	178.49(2)	
73	tantalum	Ta	180.95	
74	tungsten	W	183.84	
75	rhenium	Re	186.21	
76	osmium	Os	190.23(3)	g
77	iridium	Ir	192.22	
78	platinum	Pt	195.08	
79	gold	Au	196.97	
80	mercury	Hg	200.59(2)	
81	thallium	Tl	[204.38; 204.39]	
82	lead	Pb	207.2	g r
83	bismuth	Bi	208.98	
84	polonium*	Po		
85	astatine*	At		
86	radon*	Rn		
87	francium*	Fr		
88	radium*	Ra		
89	actinium*	Ac		
90	thorium*	Th	232.04	g
91	protactinium*	Pa	231.04	
92	uranium*	U	238.03	g m
93	neptunium*	Np		
94	plutonium*	Pu		
95	americium*	Am		
96	curium*	Cm		
97	berkelium*	Bk		
98	californium*	Cf		
99	einsteinium*	Es		
100	fermium*	Fm		
101	mendelevium*	Md		
102	nobelium*	No		
103	lawrencium*	Lr		
104	rutherfordium*	Rf		
105	dubnium*	Db		
106	seaborgium*	Sg		
107	bohrium*	Bh		
108	hassium*	Hs		
109	meitnerium*	Mt		
110	darmstadtium*	Ds		
111	roentgenium*	Rg		
112	copernicium *	Cn		
113	ununtrium*	Uut		
114	ununquadium*	Uuq		
115	ununpentium*	Uup		

(*continues on next page*)

Table 5 (*Continued*).

Order of atomic number				
Atomic number	Element name	Symbol	Atomic weight	Footnotes
116	ununhexium*	Uuh		
118	ununoctium*	Uuo		

*Element has no stable isotopes. One or more well-known isotopes are given in Table 3 with the appropriate relative atomic mass and half-life. However, three such elements (Th, Pa, and U) do have a characteristic terrestrial isotopic composition, and for these an atomic weight is tabulated.

g Geological specimens are known in which the element has an isotopic composition outside the limits for normal material. The difference between the atomic weight of the element in such specimens and that given in the table may exceed the stated uncertainty.

m Modified isotopic compositions may be found in commercially available material because it has been subjected to an undisclosed or inadvertent isotopic fractionation. Substantial deviations in atomic weight of the element from that given in the table can occur.

r Range in isotopic composition of normal terrestrial material prevents a more precise A_r(E) being given; the tabulated A_r(E) value and uncertainty should be applicable to normal material.

6. CONVENTIONAL ATOMIC-WEIGHT VALUES FOR SELECTED ELEMENTS

At its 2009 meeting in Vienna, the Commission reviewed recommendations from the task group of the IUPAC project "Assessment of fundamental understanding of isotopic abundances and atomic weights of the chemical elements" [8]. In addition to recommending that intervals be included in the 2009 Table of Standard Atomic Weights for elements having two or more isotopes when the variation in atomic weights in natural terrestrial occurrences exceeds that of the measurement uncertainty of the standard atomic weight determined from a best measurement of isotopic abundances, the task group recognized that some users may need a representative value for an element having an atomic-weight interval, such as for trade and commerce. Conventional atomic-weight values are conventional quantity values [21], and they are provided in Table 6 for these users. These conventional values have no uncertainty values associated with them. They have been selected so that most or all natural terrestrial atomic-weight variation is covered in an interval of plus or minus one in the last digit. For example, the conventional atomic-weight value of boron, 10.81, is selected to account for boron-bearing materials with atomic-weight values between 10.80 and 10.82, which is the majority of boron-bearing substances (Fig. 5).

Table 6 Conventional atomic weights 2009.

[For users needing an atomic-weight value for an unspecified sample, such as for trade and commerce, the following conventional values are provided.]

Element name	Symbol	Atomic number	Reference atomic weight
boron	B	5	10.81
carbon	C	6	12.011
chlorine	Cl	17	35.45
hydrogen	H	1	1.008
lithium	Li	3	6.94
nitrogen	N	7	14.007
oxygen	O	8	15.999
silicon	Si	14	28.085
sulfur	S	16	32.06
thallium	Tl	81	204.38