Useful Data on Some Standard Buffer Solutions

	Molecular formula	Molarity (mol kg^{-1})	Relative molar mass	Density at 20°C (g cm^{-3})	Molarity at 20°C (mol l^{-1})	Mass of 1 l at 20°C (g)	Mass tolerance for ± 0.001 pH[a] (g)	Mass tolerance expressed as a percentage (%)
Potassium tetraoxalate	$KH_3C_4O_8 \cdot 2H_2O$	0.1	254.1913	1.0091	0.09875	25.1017	0.07	0.27
Potassium tetraoxalate	$KH_3C_4O_8 \cdot 2H_2O$	0.05	254.1913	1.0038	0.04965	12.6202	0.034	0.26
Disodium hydrogen orthophosphate	Na_2HPO_4	0.025	141.9588	1.0038	0.02492	3.5379	0.02	0.56
Potassium dihydrogen orthophosphate	KH_2PO_4	0.025	136.0852			3.3912	0.02	0.58
Disodium tetraborate	$Na_2B_4O_7 \cdot 10H_2O$	0.05	381.367	1.0075	0.04985	19.0117	0.9	4.73
Disodium tetraborate	$Na_2B_4O_7 \cdot 10H_2O$	0.01	381.367	1.0001	0.009981	3.8064	0.19	0.49
Sodium carbonate	Na_2CO_3	0.025	105.9887	1.0021	0.02494	2.6428	0.017	0.064
Sodium hydrogencarbonate	$NaHCO_3$	0.025	84.0069			2.0947	0.013	0.62

[a]Calculated from known dilution value of solution.
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14. PROPERTIES OF PARTICLES, ELEMENTS AND NUCLIDES

Properties of Some Particles

Name	Symbol[a]	Spin I	Charge number z	Rest mass		Magnetic moment μ/μ_N	Meanlife τ/s
				m/u	mc^2/MeV		
Photon	γ	1	0	0	0		
Neutrino	ν_e	1/2	0	0	0		
Electron[b]	e	1/2	−1	$5.485\,799\,03\,(13) \times 10^{-4}$	0.510 999 06 (15)	1.001 159 652 193 (10)[c]	
Muon	$\mu^{\pm}$	1/2	±1	0.113 428 913 (17)	105.658 389 (34)	1.001 165 923 (8)[d]	$2.197\,3\,(4) \times 10^{-6}$
Pion	$\pi^{\pm}$	1	±1	0.149 832 3 (8)	139.5679 (7)		$2.6030\,(24) \times 10^{-8}$
Pion	π^0	1	0	0.144 9008 (9)	134.9743 (8)		$8.4\,(6) \times 10^{-17}$
Proton	p	1/2	1	1.007 276 470 (12)	938.272 31 (28)	2.792 847 386 (63)	
Neutron	n	1/2	0	1.008 664 904 (14)	939.565 63 (28)	−1.913 042 75 (45)	889.1 (21)
Deuteron	d	1	1	2.013 553 214 (24)	1875.613 39 (53)	0.857 437 6 (1)	
Triton	t	1/2	1	3.015 500 71 (4)	2808.921 78 (85)	2.978 960 (1)	
Helion	h	1/2	2	3.014 932 23 (4)	2808.392 25 (85)	−2.127 624 (1)	
α-Particle	α	0	2	4.001 506 170 (50)	3727.380 3 (11)	0	

[a]The Particle Data Group recommends the use of italic symbols for particles and this has been adopted by many physicists.
[b]The electron as β-particle is sometimes denoted by β.
[c]The value is given in Bohr magnetons μ/μ_B, $\mu_B = e\hbar/2m_e$.
[d]The value is given as μ/μ_μ, where $\mu_\mu = e\hbar/2m_\mu$.
(Reprinted with permission from Mills I *et al.* (1993) *Quantities, Units and Symbols in Physical Chemistry*, 2nd edn. Oxford: Blackwell Scientific Publications.)

In nuclear physics and chemistry the masses of particles are often quoted as their energy equivalents (usually in mega electronvolts). The unified atomic mass unit corresponds to 931.494 32 (28) MeV.

Atom-like pairs of a positive particle and an electron are sometimes sufficiently stable to be treated as individual entities with special names.

Examples

positronium (e^+e^-) $m(e^+e^-) = 1.097\ 152\ 503(26) \times 10^{-3}$u
muonium (μ^+e^-; Mu) $m(\text{Mu}) = 0.113\ 977\ 478(17)$u

The positive or negative sign for the magnetic moment of a particle implies that the orientation of the magnetic dipole with respect to the angular momentum corresponds to the rotation of a positive or negative charge respectively.

Standard Atomic Weights of the Elements 1991

As agreed by the IUPAC Commission on Atomic Weights and Isotopic Abundances in 1979 the relative atomic mass (atomic weight) of an element, E, can be defined for any specified sample. It is the average mass of its atoms in the sample divided by the unified atomic mass unit* or alternatively the molar mass of its atoms divided by the standard molar mass $M^\theta = Lm_u = 1\ \text{g mol}^{-1}$:

$$A_r(\text{E}) = \bar{m}_a(\text{E})/\text{u} = M(\text{E})M^\theta$$

The variations in isotopic composition of many elements in samples of different origin limit the precision to which a relative atomic mas can be given. The standard atomic weights revised biennially by the IUPAC Commission on Atomic Weights and Isotopic Abundances are meant to be applicable for normal materials. This means that to a high level of confidence the relative atomic mass of an element in any normal sample will be within the uncertainty limits of the tabulated value. By 'normal' it is meant here that the material is a reasonably possible source of the element or its compounds in commerce for industry and science and that it has not been subject to significant modification of isotopic composition within a geologically brief period. This, of course, excludes materials studied themselves for very anomalous isotopic composition.

The relative atomic masses of many elements depend on the origin and treatment of the materials. The notes to this table explain the types of variation to be expected for individual elements.

A value in brackets denotes the mass number of the most stable isotope. ρ denotes density, $\theta_{C,m}$ denotes melting temperature, $\theta_{C,b}$ denotes boiling temperature and c_p denotes specific heat capacity. subl. denotes sublimes.

Element	Symbol	Atomic number	Relative atomic mass	ρ (g cm^{-3})	$\theta_{C,m}$ (°C)	$\theta_{C,b}$ (°C)	c_p (J kg^{-1} K^{-1})	Oxidation states	Note
Actinium	Ac	89	(227)	10.1	1050	3200		3	A
Aluminium	Al	13	26.9815	2.70	660	2470	900	3	
Americium	Am	95	(243)	11.7	(1200)	(2600)	140	3,4,5,6	A
Antimony	Sb	51	121.75	6.62	630	1380	209	3,5	g
Argon	Ar	18	39.948	1.40(87 K)	− 189	− 186	519		g,r
Arsenic (α, grey)	As	33	74.9216	5.72		613 subl.	326	3,5	
Astatine	At	85	(210)		(302)				A
Barium	Ba	56	137.34	3.51	714	1640′		2	
Berkelium	Bk	97	(247)					3,4	A
Beryllium	Be	4	9.01218	1.85	1280	2477	1.82×10^3	2	
Bismuth	Bi	83	208.9806	9.80	271	1560	121	3,5	
Boron	B	5	10.81	2.34	2300	3930	1.03×10^3	3	g,m,r
Bromine	Br	35	79.904	3.12	− 7.2	58.8	448	1,3,4,5,6	
Cadmium	Cd	48	112.40	8.64	321	765	230	2	g
Caesium	Cs	55	132.9055	1.90	28.7	690	234	1	
Calcium	Ca	20	40.08	1.54	850	1487	653	2	g
Californium	Cf	98	(251)					3	A
Carbon (graphite)	C	6	12.011	2.25 (graphite) 3.51 (diamond)	3730 subl.	4830	711 (graphite) 519 (diamond)	2,4	r

*Note that the atomic mass constant, m_u, is equal to the unified atomic mass unit, u, and is defined in terms of the mass of the carbon-12 atom: $m_u = 1\text{u} = m_a\ (^{12}\text{C})/12$.

Element	Symbol	Atomic number	Relative atomic mass	ρ (g cm^{-3})	$\theta_{C,m}$ (°C)	$\theta_{C,b}$ (°C)	c_p (J kg^{-1} K^{-1})	Oxidation states	Note
Cerium	Ce	58	140.12	6.78	795	3470	184	3,4	g
Chlorine	Cl	17	35.453	1.56(238 K)	− 101	34.7	477	1,3,4,5,6,7	m
Chromium	Cr	24	51.996	7.19	1890	2482	448	2,3,6	
Cobalt	Co	27	58.9332	8.90	1492	2900	435	2,3	
Copper	Cu	29	63.546	8.92	1083	2595	385	1,2	r
Curium	Cm	96	(247)					3	A
Dysprosium	Dy	66	162.50	8.56	1410	2600	172	3	g
Einsteinium	Es	99	(254)					3	A
Erbium	Er	68	167.26	9.16	1500	2900	167	3	g
Europium	Eu	63	151.96	5.24	826	1440	138	2,3	g
Fermium	Fm	100	(253)					3	A
Fluorine	F	9	18.9984	1.11 (85 K)	− 220	− 188	824	1	
Francium	Fr	87	(223)		(27)			1	A
Gadolinium	Gd	64	157.25	7.95	1310	3000	234	3	g
Gallium	Ga	31	69.72	5.91	29.8	2400	381	3	
Germanium	Ge	32	72.59	5.35	937	2830	322	4	
Gold	Au	79	196.9665	19.3	1063	2970	130	1,3	
Hafnium	Hf	72	178.49	13.3	2220	5400	146	4	
Helium	He	2	4.00260	0.147 (4 K)	− 270	− 269	5.19×10^3		g,r
Holmium	Ho	67	164.9303	8.80	1460	2600	163	3	
Hydrogen	H	1	1.0080	0.070 (20 K)	− 259	− 252	1.43×10^4	1	g,m,r
Indium	In	49	114.82	7.30	157	2000	238	1,3	
Iodine	I	53	126.9045	4.93	114	184	218	1,3,5,7	
Iridium	Ir	77	192.22	22.5	2440	5300	134	2,3,4,6	
Iron	Fe	26	55.847	7.86	1535	3000	448	2,3,6	
Krypton	Kr	36	83.80	2.16 (121 K)	− 157	− 152	247	2	g,m
Lanthanum	La	57	138.9055	6.19	920	3470	201	3	g
Lawrencium	Lr	103	(257)						A
Lead	Pb	82	207.2	11.3	327	1744	130	2,4	g,r
Lithium	Li	3	6.941	0.53	180	1330	3.39×10^3	1	g,m,r,
Lutetium	Lu	71	174.97	9.84	1650	3330	155	3	g
Magnesium	Mg	12	24.305	1.74	650	1110	1.03×10^3	2	
Manganese	Mn	25	54.9380	7.20	1240	2100	477	2,3,4,6,7	
Mendelevium	Md	101	(256)					3	A
Mercury	Hg	80	200.59	13.6	− 38.9	357	138	1,2	
Molybdenum	Mo	42	95.94	10.2	2610	5560	251	2,3,4,5,6	g
Neodymium	Nd	60	144.24	7.00	1020	3030	188	3	g
Neon	Ne	10	20.179	1.20 (27 K)	− 249	− 246	1.03×10^3		g,m
Neptunium	Np	93	(237)	20.4	640			3,4,5,6	A
Nickel	Ni	28	58.71	8.90	1453	2730	439	2,3	
Niobium	Nb	41	92.9064	8.57	2470	3300	264	3,5	
Nitrogen	N	7	14.0067	0.808 (77 K)	− 210	− 196	1.04×10^3	1,2,3,4,5	g,r
Nobelium	No	102	(254)						A
Osmium	Os	76	190.2	22.5	3000	5000	130	2,3,4,6,8	g
Oxygen	O	8	15.9994	1.15 (90 K)	− 218	− 183	916	2	g,r
Palladium	Pd	46	106.4	12.0	1550	3980	243	2,4	g
Phosphorus	P	15	30.9738	1.82 (white) 2.34 (red)	44.2 (white) 590 (red)	280 (white)	757 (white) 670 (red)	3,5	
Platinum	Pt	78	195.09	21.4	1769	4530	134	2,4,6	
Plutonium	Pu	94	(242)	19.8	640	3240		3,4,5,6	A
Polonium	Po	84	(210)	9.4	254	960	126	2,4	A
Potassium	K	19	39.102	0.86	63.7	774	753	1	
Praseodymium	Pr	59	140.9077	6.78	935	3130	192	3,4	
Promethium	Pm	61	(147)		1030	2730	184	3	A
Protoactinium	Pa	91	(231)	15.4	1230		121	4,5	Z
Radium	Ra	88	(226)	5.0	700	1140	121	2	A
Radon	Rn	86	(222)	4.4 (211 K)	− 71	− 61.8	92		A
Rhenium	Re	75	186.2	20.5	3180	5630	138	2,4,5,6,7	
Rhodium	Rh	45	102.9055	12.4	1970	4500	243	2,3,4	
Rubidium	Rb	37	85.4678	1.53	38.9	688	360	1	g
Ruthenium	Ru	44	101.07	12.3	2500	4900	238	3,4,5,6,8	g

Element	Symbol	Atomic number	Relative atomic mass	ρ (g cm^{-3})	$\theta_{C,m}$ (°C)	$\theta_{C,b}$ (°C)	c_p (J kg^{-1} K^{-1})	Oxidation states	Note
Samarium	Sm	62	150.4	7.54	1070	1900	197	2,3	g
Scandium	Sc	21	44.9559	2.99	1540	2730	556	3	
Selenium	Se	34	78.96	4.81	217	685	322	2,4,6	
Silicon	Si	14	28.086	2.33	1410	2360	711	4	r
Silver	Ag	47	107.868	10.5	961	2210	234	1	g
Sodium	Na	11	22.9898	0.97	97.8	890	1.23×10^3	1	
Strontium	Sr	38	87.62	2.62	768	1380	284	2	g,r
Sulphur (α, rhombic)	S	16	32.06	2.07 (α) 1.96 (β)	113 (α) 119 (β)	445	732	2,4,6	g,r
Tantalum	Ta	73	180.9479	16.6	3000	5420	138	5	
Technetium	Tc	43	(99)	11.5	2200	3500	243	7	A
Tellurium	Te	52	127.60	6.25	450	990	201	2,4,6	g
Terbium	Tb	65	158.9254	8.27	1360	2800	184	3,4	
Thallium	Tl	81	204.37	11.8	304	1460	130	1,3	
Thorium	Th	90	232.0381	11.7	1750	3850	113	3,4	g,Z
Thulium	Tm	69	168.9342	9.33	1540	1730	159	2,3	
Tin (white)	Sn	50	118.69	7.28 (white) 5.75 (grey)	232	2270	218	2,4	g
Titanium	Ti	22	47.90	4.54	1675	3260	523	2,3,4	
Tungsten	W	74	183.85	19.4	3410	5930	134	2,4,5,6	
Unnilennium	Une	109							A,U
Unnilhexium	Unh	106							A,U
Unniloctium	Uno	108							A,U
Unnilpentium	Unp	105							A,U
Unnilquadium	Unq	104							A,U
Unnilseptium	Uns	107							A,U
Uranium	U	92	238.029	19.1	1130	3820	117	3,4,5,6	g,m,Z
Vanadium	V	23	50.9414	5.96	1900	3000	481	2,3,4,5	
Xenon	Xe	54	131.30	3.52 (165 K)	− 112	− 108	159	2,4,6,8	g,m
Ytterbium	Yb	70	173.04	6.98	824	1430	146	2,3	g
Yttrium	Y	39	88.9059	4.34	1500	2930	297	3	
Zinc	Zn	30	65.37	7.14	420	907	385	2	
Zirconium	Zr	40	91.22	6.49	1850	3580	276	2,3,4	g

(g) geologically exceptional specimens are known in which the element has an isotopic composition outside the limits for normal material. The difference between the average relative atomic mass of the element in such specimens and that given in the table may exceed considerably the implied uncertainty.
(m) modified isotopic compositions may be found in commercially available material because it has been subjected to an undisclosed or inadvertent isotopic separation. Substantial deviations in relative atomic mass of the element from that given in the table can occur.
(r) range in isotopic composition of normal terrestrial material prevents a more precise relative atomic mass being given; the tabulated A_r(E) value should be applicable to any normal material.
(A) Radioactive element that lacks a characteristic terrestrial isotopic composition.
(Z) An element without stable nuclide(s), exhibiting a range of characteristic terrestrial compositions of long-lived radionuclide(s) such that a meaningful relative atomic mass can be given.
(U) The names and symbols given here are systematic and based on the atomic numbers of the elements as recommended by the IUPAC Commission on the Nomenclature of Inorganic Chemistry. The names are composed of the following roots representing digits of the atomic number:

1 un,	2 bi,	3 tri,	4 quad,	5 pent,
6 hex,	7 sept,	8 oct,	9 enn,	0 nil

The ending -ium is then added to the three roots. The three-letter symbols are derived from the first letters of the corresponding roots.
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Electronic Configurations of the Elements (Ground States)

Atomic number	Element	Shell									
		K	L		M			N			
		1s	2s	2p	3s	3p	3d	4s	4p	4d	4f
1	Hydrogen	1									
2	Helium	2									
3	Lithium	2	1								
4	Beryllium	2	2								
5	Boron	2	2	1							
6	Carbon	2	2	2							
7	Nitrogen	2	2	3							
8	Oxygen	2	2	4							
9	Fluorine	2	2	5							
10	Neon	2	2	6							
11	Sodium	2	2	6	1						
12	Magnesium	2	2	6	2						
13	Aluminium	2	2	6	2	1					
14	Silicon	2	2	6	2	2					
15	Phosphorus	2	2	6	2	3					
16	Sulphur	2	2	6	2	4					
17	Chlorine	2	2	6	2	5					
18	Argon	2	2	6	2	6					
19	Potassium	2	2	6	2	6		1			
20	Calcium	2	2	6	2	6		2			
21	Scandium	2	2	6	2	6	1	2			
22	Titanium	2	2	6	2	6	2	2			
23	Vanadium	2	2	6	2	6	3	2			
24	Chromium	2	2	6	2	6	5	1			
25	Manganese	2	2	6	2	6	5	2			
26	Iron	2	2	6	2	6	6	2			
27	Cobalt	2	2	6	2	6	7	2			
28	Nickel		2	6	2	6	8	2			
29	Copper	2	2	6	2	6	10	1			
30	Zinc	2	2	6	2	6	10	2			
31	Gallium	2	2	6	2	6	10	2	1		
32	Germanium	2	2	6	2	6	10	2	2		
33	Arsenic	2	2	6	2	6	10	2	3		
34	Selenium	2	2	6	2	6	10	2	4		
35	Bromine	2	2	6	2	6	10	2	5		
36	Krypton	2	2	6	2	6	10	2	6		

Atomic number	Element	Shell													
		K	L	M	N				O				P		
					4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d
37	Rubidium	2	8	18	2	6		1							
38	Strontium	2	8	18	2	6		2							
39	Yttrium	2	8	18	2	6	1	2							
40	Zirconium	2	8	18	2	6	2	2							
41	Niobium	2	8	18	2	6	4	1							
42	Molybdenum	2	8	18	2	6	5	1							
43	Technetium	2	8	18	2	6	6	1							
44	Ruthenium	2	8	18	2	6	7	1							
45	Rhodium	2	8	18	2	6	8	1							
46	Palladium	2	8	18	2	6	10								

Atomic number	Element	Shell													
		K	L	M	N				O				P		
					4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d
47	Silver	2	8	18	2	6	10	1							
48	Cadmium	2	8	18	2	6	10	2							
49	Indium	2	8	18	2	6	10	2	1						
50	Tin	2	8	18	2	6	10	2	2						
51	Antimony	2	8	18	2	6	10	2	3						
52	Tellurium	2	8	18	2	6	10	2	4						
53	Iodine	2	8	18	2	6	10	2	5						
54	Xenon	2	8	18	2	6	10	2	6						
55	Caesium	2	8	18	2	6	10		2	6		1			
56	Barium	2	8	18	2	6	10		2	6		2			
57	Lanthanum	2	8	18	2	6	10		2	6	1	2			
58	Cerium	2	8	18	2	6	10	2	2	6		2			
59	Praseodymium	2	8	18	2	6	10	3	2	6		2			
60	Neodymium	2	8	18	2	6	10	4	2	6		2			
61	Promethium	2	8	18	2	6	10	5	2	6		2			
62	Samarium	2	8	18	2	6	10	6	2	6		2			
63	Europium	2	8	18	2	6	10	7	2	6		2			
64	Gadolinium	2	8	18	2	6	10	7	2	6	1	2			
65	Terbium	2	8	18	2	6	10	9	2	6		2			
66	Dysprosium	2	8	18	2	6	10	10	2	6		2			
67	Holmium	2	8	18	2	6	10	11	2	6		2			
68	Erbium	2	8	18	2	6	10	12	2	6		2			
69	Thulium	2	8	18	2	6	10	13	2	6		2			
70	Ytterbium	2	8	18	2	6	10	14	2	6		2			
71	Lutetium	2	8	18	2	6	10	14	2	6	1	2			
72	Hafnium	2	8	18	2	6	10	14	2	6	2	2			
73	Tantalum	2	8	18	2	6	10	14	2	6	3	2			
74	Tungsten	2	8	18	2	6	10	14	2	6	4	2			
75	Rhenium	2	8	18	2	6	10	14	2	6	5	2			
76	Osmium	2	8	18	2	6	10	14	2	6	6	2			
77	Iridium	2	8	18	2	6	10	14	2	6	9				
78	Platinum	2	8	18	2	6	10	14	2	6	9	1			
79	Gold	2	8	18	2	6	10	14	2	6	10	1			
80	Mercury	2	8	18	2	6	10	14	2	6	10	2			
81	Thallium	2	8	18	2	6	10	14	2	6	10	2	1		
82	Lead	2	8	18	2	6	10	14	2	6	10	2	2		
83	Bismuth	2	8	18	2	6	10	14	2	6	10	2	3		
84	Polonium	2	8	18	2	6	10	14	2	6	10	2	4		
85	Astatine	2	8	18	2	6	10	14	2	6	10	2	5		
86	Radon	2	8	18	2	6	10	14	2	6	10	2	6		

Atomic number	Element	Shell											
		K	L	M	N	O				p			Q
						5s	5p	5d	5f	6s	6p	6d	7s
87	Francium	2	8	18	32	2	6	10		2	6		1
88	Radium	2	8	18	32	2	6	10		2	6		2
89	Actinium	2	8	18	32	2	6	10		2	6	1	2
90	Thorium	2	8	18	32	2	6	10		2	6	2	2
91	Protoactinium	2	8	18	32	2	6	10	2	2	6	1	2
92	Uranium	2	8	18	32	2	6	10	3	2	6	1	2
93	Neptunium	2	8	18	32	2	6	10	4	2	6	1	2
94	Plutonium	2	8	18	32	2	6	10	6	2	6		2
95	Americium	2	8	18	32	2	6	10	7	2	6		2

Atomic number	Element	Shell											
		K	L	M	N	O				p			Q
						5s	5p	5d	5f	6s	6p	6d	7s
96	Curium	2	8	18	32	2	6	10	7	2	6	1	2
97	Berkelium	2	8	18	32	2	6	10	8	2	6	1	2
98	Californium	2	8	18	32	2	6	10	10	2	6		2
99	Einsteinium	2	8	18	32	2	6	10	11	2	6		2
100	Fermium	2	8	18	32	2	6	10	12	2	6		2
101	Mendelevium	2	8	18	32	2	6	10	13	2	6		2
102	Nobelium	2	8	18	32	2	6	10	14	2	6		2
103	Lawrencium	2	8	18	32	2	6	10	14	2	6	1	2

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Properties of Nuclides

The table contains the following properties of naturally occurring and some unstable nuclides:

Column

1. Z is the atomic number (number of protons) of the nuclide.
2. Symbol of the element.
3. A is the mass number of the nuclide. The * sign denotes an unstable nuclide (for elements without naturally occurring isotopes it is the most stable nuclide) and the # sign a nuclide of sufficiently long lifetime to enable the determination of its isotopic abundance.
4. The atomic mass is given in unified atomic mass units, $u = m_a(^{12}C)/12$, together with the standard errors in parentheses and applicable to the last digit quoted.
5. Isotopic abundances are given as mole fractions, x, of the corresponding atoms in percents. They were recommended in 1989 by the IUPAC Commission on Atomic Weights and Isotopic Abundances. The uncertainties given in parentheses are applicable to the last digits quoted and cover the range of probable variations in the materials as well as experimental errors.
6. I is the nuclear spin quantum number.
7. Under magnetic moment the maximum z-component expectation value of the magnetic dipole moment, m, in nuclear magnetons is given. The positive or negative sign implies that the orientation of the magnetic dipole with respect to the angular momentum corresponds to the rotation of a positive or negative charge, respectively. An asterisk * indicates that more than one value is given in the original compilation. The value of highest precision or most recent data is given here.
8. Under quadrupole moment, the electric quadrupole moment area is given in units of square femtometres, $fm^2 = 10^{-30}\ m^2$, although most of the tables quote them in barns ($1\ barn = 10^{-28}\ m^2 = 100\ fm^2$). The positive sign implies a prolate nucleus, the negative sign an oblate nucleus. The data for $Z \leq 20$ were taken from the compilation by P. Pyykkö with values for Cl and Ca corrected by D. Sundholm (private communication), and the others from P. Raghavan. An asterisk* indicates that more than one value is given in the original compilation.

Z	Symbol	A	Atomic mass, m_a (u)	Isotopic abundance, $100\,x$	Nuclear spin, I	Magnetic moment, m (μ_N)	Quadrupole moment, Q (fm^2)
1	H	1	1.007 825 035 (12)	99.985 (1)	1/2	+ 2.792 847 386 (63)	
	(D)	2	2.014 101 779 (24)	0.015 (1)	1	+ 0.857 438 230 (24)	+ 0.2860 (15)
	(T)	3*	3.016 049 27 (4)		1/2	+ 2.978 962 479 (68)	
2	He	3	3.016 029 31 (4)	0.000 137 (3)	1/2	− 2.127 624 848 (66)	
		4	4.002 603 24 (5)	99.999 863 (3)	0	0	
3	Li	6	6.015 1214 (7)	7.5 (2)	1	+ 0.822 056 67 (26)*	− 0.082 (4)
		7	7.016 0030 (9)	92.5 (2)	3/2	+ 3.256 462 53 (40)*	− 4.01

Z	Symbol	A	Atomic mass, m_a (u)	Isotopic abundance, $100\,x$	Nuclear spin, I	Magnetic moment, m (μ_N)	Quadrupole moment, Q (fm^2)
4	Be	9	9.012 1822 (4)	100	3/2	− 1.177 492 (17)*	+ 5.288 (38)
5	B	10	10.012 936 9 (3)	19.9 (2)	3	+ 1.800 644 75 (57)	+ 8.459 (24)
		11	11.009 3054 (4)	80.1 (2)	3/2	+ 2.688 6489 (10)	+ 4.059 (10)
6	C	12	12 (by definition)	98.90 (3)	0	0	
		13	13.003 354 826 (17)	1.10 (3)	1/2	+ 0.702 4118 (14)	
		14*	14.003 241 982 (27)		0	0	
7	N	14	14.003 074 002 (26)	99.634 (9)	1	+ 0.403 761 00 (6)	+ 2.01 (2)
		15	15.000 108 97 (4)	0.366 (9)	1/2	− 0.283 188 842 (45)	
8	O	16	15.994 914 63 (5)	99.762 (15)	0	0	
		17	16.999 1312 (4)	0.038 (3)	5/2	− 1.893 80	− 2.558 (22)
		18	17.999 1603 (9)	0.200 (12)	0	0	
9	F	19	18.998 403 22 (15)	100	1/2	+ 2.628 868 (8)	
10	Ne	20	19.992 4356 (22)	90.48 (3)	0	0	
		21	20.993 8428 (21)	0.27 (1)	3/2	− 0.661 797 (5)	+ 10.155 (75)
		22	21.991 3831 (18)	9.25 (3)	0	0	
11	Na	23	22.989 7677 (10)	100	3/2	+ 2.217 6556 (6)*	+ 10.06 (20)
12	Mg	24	23.985 0423 (8)	78.99 (3)	0	0	
		25	24.985 8374 (8)	10.00 (1)	5/2	− 0.855 465 (8)	+ 19.94 (20)
		26	25.982 5937 (8)	11.01 (2)	0	0	
13	Al	27	26.981 5386 (8)	100	5/2	+ 3.641 504 687 (65)	+ 14.03 (10)
14	Si	28	27.976 9271 (7)	92.23 (1)	0	0	
		29	28.976 4949 (7)	4.67 (1)	1/2	− 0.555 29 (3)	
		30	29.973 7707 (7)	3.10 (1)	0	0	
15	P	31	30.973 7620 (6)	100	1/2	+ 1.131 60 (3)	
16	S	32	31.972 070 70 (25)	95.02 (9)	0	0	
		33	32.971 458 43 (23)	0.75 (1)	3/2	+ 0.643 8212 (14)	− 6.78 (13)
		34	33.967 866 65 (22)	4.21 (8)	0	0	
		36	35.967 080 62 (27)	0.02 (1)	0	0	
17	Cl	35	34.968 852 721 (69)	75.77 (5)	3/2	+ 0.821 8743 (4)	− 8.11 (8)
		37	36.965 902 62 (11)	24.23 (5)	3/2	+ 0.684 1236 (4)	− 6.39 (6)
18	Ar	36	35.967 545 52 (29)	0.337 (3)	0	0	
		38	37.962 7325 (9)	0.063 (1)	0	0	
		40	39.962 3837 (14)	99.600 (3)	0	0	
19	K	39	38.963 7074 (12)	93.2581 (44)	3/2	+ 0.391 507 31 (12)*	+ 5.9 (6)
		40	39.963 9992 (12)	0.0117 (1)	4	− 1.298 1003 (34)	− 7.3 (7)
		41	40.961 8254 (12)	6.7302 (44)	3/2	+ 0.214 870 09 (22)	+ 7.2 (7)
20	Ca	40	39.962 5906 (13)	96.941 (18)	0	0	
		42	41.958 6176 (13)	0.647 (9)	0	0	
		43	42.958 7662 (13)	0.135 (6)	7/2	− 1.317 643 (7)	− 4.09 (8)
		44	43.955 4806 (14)	2.086 (12)	0	0	
		46	45.953 689 (4)	0.004 (4)	0	0	
		48	47.952 533 (4)	0.187 (4)	0	0	
21	Sc	45	44.955 9100 (14)	100	7/2	+ 4.756 4866 (18)	− 22 (1)*

Z	Symbol	A	Atomic mass, m_a (u)	Isotopic abundance, $100\,x$	Nuclear spin, I	Magnetic moment, m (μ_N)	Quadrupole moment, Q (fm^2)
22	Ti	46	45.952 6294 (14)	8.0 (1)	0	0	
		47	46.951 7640 (11)	7.3 (1)	5/2	− 0.788 48 (1)	+ 29 (1)
		48	47.947 9473 (11)	73.8 (1)	0	0	
		49	48.947 8711 (11)	5.5 (1)	7/2	− 1.104 17 (1)	+ 24 (1)
		50	49.944 7921 (12)	5.4 (1)	0	0	
23	V	50#	49.947 1609 (17)	0.250 (2)	6	+ 3.345 6889 (14)	20.9 (40)*
		51	50.943 9617 (17)	99.750 (2)	7/2	+ 5.148 705 73 (18)	− 5.2 (10)*
24	Cr	50	49.946 0464 (17)	4.345 (13)	0	0	
		52	51.940 5098 (17)	83.789 (18)	0	0	
		53	52.940 6513 (17)	9.501 (17)	3/2	− 0.474 54 (3)	− 15 (5)*
		54	53.938 8825 (17)	2.365 (7)	0	0	
25	Mn	55	54.938 047 1 (16)	100	5/2	+ 3.468 7190 (9)	+ 33 (1)*
26	Fe	54	53.939 6127 (15)	5.8 (1)	0	0	
		56	55.934 9393 (16)	91.72 (30)	0	0	
		57	56.935 3958 (16)	2.2 (1)	1/2	+ 0.090 623 00 (9)*	
		58	57.933 2773 (16)	0.28 (1)	0	0	
27	Co	59	58.933 1976 (16)	100	7/2	+ 4.627 (9)	+ 40.4 (40)*
28	Ni	58	57.935 3462 (16)	68.077 (9)	0	0	
		60	59.930 7884 (16)	26.223 (8)	0	0	
		61	60.931 0579 (16)	1.140 (1)	3/2	− 0.750 02 (4)	+ 16.2 (15)
		62	61.928 3461 (16)	3.634 (2)	0	0	
		64	63.927 9679 (17)	0.926 (1)	0	0	
29	Cu	63	62.929 5989 (17)	69.17 (3)	3/2	+ 2.2227 3456 (14)*	− 21.1 (4)*
		65	64.927 7959 (20)	30.83 (3)	3/2	+ 2.381 61 (19)*	− 19.5 (4)
30	Zn	64	63.929 1448 (19)	48.6 (3)	0	0	
		66	65.926 0347 (17)	27.9 (2)	0	0	
		67	66.927 1291 (17)	4.1 (1)	5/2	+ 0.875 2049 (11)*	+ 15.0 (15)
		68	67.924 8459 (18)	18.8 (4)	0	0	
		70	69.925 325 (4)	0.6 (1)	0	0	
31	Ga	69	68.925 580 (3)	60.108 (9)	3/2	+ 2.016 589 (44)	+ 16.8*
		71	70.924 7005 (25)	39.892 (9)	3/2	+ 2.562 266 (18)	+ 10.6*
32	Ge	70	69.924 2497 (16)	21.23 (4)	0	0	
		72	71.992 0789 (16)	27.66 (3)	0	0	
		73	72.923 4626 (16)	7.73 (1)	9/2	− 0.879 4677 (2)	− 17.3 (26)
		74	73.921 1774 (15)	35.94 (2)	0	0	
		76	75.921 4016 (17)	7.44 (2)	0	0	
33	As	75	74.921 5942 (17)	100	3/2	+ 1.439 475 (65)	+ 31.4 (6)*
34	Se	74	73.922 4746 (16)	0.89 (2)	0	0	
		76	75.919 2120 (16)	9.36 (1)	0	0	
		77	76.919 9125 (16)	7.63 (6)	1/2	+ 0.535 074 24 (28)*	
		78	77.917 3076 (16)	23.78 (9)	0	0	
		80	79.916 5196 (19)	49.61 (10)	0	0	
		82	81.916 6978 (23)	8.73 (6)	0	0	
35	Br	79	78.918 3361 (26)	50.69 (7)	3/2	+ 2.106 400 (4)	+ 33.1 (4)
		81	80.916 289 (6)	49.31 (7)	3/2	+ 2.270 562 (4)	+ 27.6 (4)
36	Kr	78	77.920 396 (9)	0.35 (2)	0	0	
		80	79.916 380 (9)	2.25 (2)	0	0	
		82	81.913 482 (6)	11.6 (1)	0	0	
		83	82.914 135 (4)	11.5 (1)	9/2	− 0.970 669 (3)	+ 25.3 (5)
		84	83.911 507 (4)	57.0 (3)	0	0	
		86	85.910 616 (5)	17.3 (2)	0	0	

Z	Symbol	A	Atomic mass, m_a (u)	Isotopic abundance, $100\,x$	Nuclear spin, I	Magnetic moment, m (μ_N)	Quadrupole moment, Q (fm^2)
37	Rb	85	84.911 794 (3)	72.165 (20)	5/2	+ 1.353 3515 (8)*	+ 22.8 (43)*
		87#	86.909 187 (3)	27.835 (20)	3/2	+ 2.751 818 (2)	+ 13.2 (1)
38	Sr	84	83.913 430 (4)	0.56 (1)	0	0	
		86	85.909 2672 (28)	9.86 (1)	0	0	
		87	86.908 8841 (28)	7.00 (1)	9/2	− 1.093 6030 (13)*	+ 33.5 (20)
		88	87.905 6188 (28)	82.58 (1)	0	0	
39	Y	89	88.905 849 (3)	100	1/2	− 0.137 415 42 (34)*	
40	Zr	90	89.904 7026 (26)	51.45 (3)	0	0	
		91	90.905 6439 (26)	11.22 (4)	5/2	− 1.303 62 (2)	− 20.6 (10)
		92	91.905 0386 (26)	17.15 (2)	0	0	
		94	93.906 3148 (28)	17.38 (4)	0	0	
		96	95.908 275 (4)	2.80 (2)	0	0	
41	Nb	93	92.906 3772 (27)	100	9/2	+ 6.1705 (3)	− 32 (2)*
42	Mo	92	91.906 809 (4)	14.84 (4)	0	0	
		94	93.905 0853 (26)	9.25 (3)	0	0	
		95	94.905 8411 (22)	15.92 (5)	5/2	− 0.9142 (1)	− 2.2 (1)*
		96	95.904 6785 (22)	16.68 (5)	0	0	
		97	96.906 0205 (22)	9.55 (3)	5/2	− 0.9335 (1)	+ 25.5 (13)*
		98	97.905 4073 (22)	24.13 (7)	0	0	
		100	99.907 477 (6)	9.63 (3)	0	0	
43	Tc	98*	97.907 215 (4)		6		
44	Ru	96	95.907 599 (8)	5.52 (6)	0	0	
		98	97.905 287 (7)	1.88 (6)	0	0	
		99	98.905 9389 (23)	12.7 (1)	5/2	− 0.6413 (51)*	+ 7.9 (4)
		100	99.904 2192 (24)	12.6 (1)	0	0	
		101	100.905 5819 (24)	17.0 (1)	5/2	− 0.7188 (60)*	+ 45.7 (23)
		102	101.904 3485 (25)	31.6 (2)	0	0	
		104	103.905 424 (6)	18.7 (2)	0	0	
45	Rh	103	102.905 500 (4)	100	1/2	− 0.088 40 (2)	
46	Pd	102	101.905 634 (5)	1.02 (1)	0	0	
		104	103.904 029 (6)	11.14 (8)	0	0	
		105	104.905 079 (6)	22.33 (8)	5/2	− 0.642 (3)	+ 66.0 (11)*
		106	105.903 478 (6)	27.33 (3)	0	0	
		108	107.903 895 (4)	26.46 (9)	0	0	
		110	109.905 167 (20)	11.72 (9)	0	0	
47	Ag	107	106.905 092 (6)	51.839 (7)	1/2	− 0.113 679 65 (15)*	
		109	108.904 756 (4)	48.161 (7)	1/2	− 0.130 690 62 (22)*	
48	Cd	106	105.906 461 (7)	1.25 (4)	0	0	
		108	107.904 176 (6)	0.89 (2)	0	0	
		110	109.903 005 (4)	12.49 (12)	0	0	
		111	110.904 182 (3)	12.80 (8)	1/2	− 0.594 886 07 (84)*	
		112	111.902 757 (3)	24.13 (28)	0	0	
		113#	112.904 400 (3)	12.22 (8)	1/2	− 0.622 300 92 (87)	
		114	113.903 357 (3)	28.73 (28)	0	0	
		116	115.904 755 (4)	7.49 (12)	0	0	
49	In	113	112.904 061 (4)	4.3 (2)	9/2	+ 5.5289 (2)	+ 79.9
		115#	114.903 882 (4)	95.7 (2)	9/2	+ 5.5408 (2)	+ 81.0*
50	Sn	112	111.904 826 (5)	0.97 (1)	0	0	
		114	113.902 784 (4)	0.65 (1)	0	0	
		115	114.903 348 (3)	0.34 (1)	1/2	− 0.918 83 (7)	

Z	Symbol	A	Atomic mass, m_a (u)	Isotopic abundance, $100\,x$	Nuclear spin, I	Magnetic moment, m (μ_N)	Quadrupole moment, Q (fm^2)
50	Sn	116	115.901 747 (3)	14.53 (11)	0	0	
		117	116.902 956 (3)	7.68 (7)	1/2	− 1.001 04 (7)	
		118	117.901 609 (3)	24.23 (11)	0	0	
		119	118.903 311 (3)	8.59 (4)	1/2	− 1.047 28 (7)	
		120	119.902 1991 (29)	32.59 (10)	0	0	
		122	121.903 4404 (30)	4.63 (3)	0	0	
		124	123.905 2743 (17)	5.79 (5)	0	0	
51	Sb	121	120.903 8212 (29)	57.36 (8)	5/2	+ 3.3634 (3)	− 36 (4)*
		123	122.904 2160 (24)	42.64 (8)	7/2	+ 2.5498 (2)	− 49 (5)
52	Te	120	119.904 048 (21)	0.096 (2)	0	0	
		122	121.903 050 (3)	2.603 (4)	0	0	
		123	122.904 2710 (22)	0.908 (2)	1/2	− 0.736 9478 (8)	
		124	123.902 8180 (18)	4.816 (6)	0	0	
		125	124.904 4285 (25)	7.139 (6)	1/2	− 0.888 505 13 (43)*	
		126	125. 903 3095 (25)	18.95 (1)	0	0	
		128	127.904 463 (4)	31.69 (1)	0	0	
		130	129.906 229 (5)	33.80 (1)	0	0	
53	I	127	126.904 473 (5)	100	5/2	+ 2.813 273 (84)	− 78.9
54	Xe	124	123.905 8942 (22)	0.10 (1)	0	0	
		126	125.904 281 (8)	0.09 (1)	0	0	
		128	127.903 5312 (17)	1.91 (3)	0	0	
		129	128.904 7801 (21)	26.4 (6)	1/2	− 0.777 9763 (84)	
		130	129.903 5094 (17)	4.1 (1)	0	0	
		131	130.905 072 (5)	21.2 (4)	3/2	+ 0.691 8619 (39)	− 12.0 (12)
		132	131.904 144 (5)	26.9 (5)	0	0	
		134	133.905 395 (8)	10.4 (2)	0	0	
		136	135.907 214 (8)	8.9 (1)	0	0	
55	Cs	133	132.905 429 (7)	100	7/2	+ 2.582 0246 (34)*	− 0.371 (14)*
56	Ba	130	129.906 282 (8)	0.106 (2)	0	0	
		132	131.905 042 (9)	0.101 (2)	0	0	
		134	133.904 486 (7)	2.417 (27)	0	0	
		135	134.905 665 (7)	6.592 (18)	3/2	+ 0.837 943 (17)*	+ 16.0 (3)*
		136	135.904 553 (7)	7.854 (36)	0	0	
		137	136.905 812 (6)	11.23 (4)	3/2	+ 0.937 365 (20)*	+ 24.5 (4)*
		138	137.905 232 (6)	71.70 (7)	0	0	
57	La	138 #	137.907 105 (6)	0.0902 (2)	5	+ 3.713 646 (7)	+ 45 (2)*
		139	138.906 347 (5)	99.9098 (2)	7/2	+ 2.783 0455 (9)	+ 20 (1)
58	Ce	136	135.907 140 (50)	0.19 (1)	0	0	
		138	137.905 985 (12)	0.25 (1)	0	0	
		140	139.905 433 (4)	88.48 (10)	0	0	
		142	141.909 241 (4)	11.08 (10)	0	0	
59	Pr	141	140.907 647 (4)	100	5/2	+ 4.2754 (5)	− 5.89 (42)
60	Nd	142	141.907 719 (4)	27.13 (12)	0	0	
		143	142.909 810 (4)	12.18 (6)	7/2	− 1.065 (5)	− 63 (6)
		144	143.910 083 (4)	23.80 (12)	0	0	
		145	144.912 570 (4)	8.30 (6)	7/2	− 0.656 (4)	− 33 (3)
		146	145.013 113 (4)	17.19 (9)	0	0	
		148	147.916 889 (4)	5.76 (3)	0	0	
		150	149.920 887 (4)	5.64 (3)	0	0	
61	Pm	145*	144.912 743 (4)		5/2		

Z	Symbol	A	Atomic mass, m_a (u)	Isotopic abundance, $100\,x$	Nuclear spin, I	Magnetic moment, m (μ_N)	Quadrupole moment, Q (fm^2)
62	Sm	144	143.911 998 (4)	3.1 (1)	0	0	
		147#	146.914 894 (4)	15.0 (2)	7/2	− 0.8148 (7)	− 25.9 (26)
		148	147.914 819 (4)	11.3 (1)	0	0	
		149	148.917 180 (4)	13.8 (1)	7/2	− 0.6717 (7)*	+ 7.5 (8)*
		150	149.917 273 (4)	7.4 (1)	0	0	
		152	151.919 728 (4)	26.7 (2)	0	0	
		154	153.922 205 (4)	22.7 (2)	0	0	
63	Eu	151	150.919 702 (8)	47.8 (15)	5/2	+ 3.4717 (6)	+ 90.3 (10)*
		153	152.921 225 (4)	52.2 (15)	5/2	+ 1.5330 (8)*	+ 241.2 (21)*
64	Gd	152	151.919 786 (4)	0.20 (1)	0	0	
		154	153.920 861 (4)	2.18 (3)	0	0	
		155	154.922 618 (4)	14.80 (5)	3/2	− 0.257 23 (35)*	+ 130 (2)*
		156	155.922 118 (4)	20.47 (4)	0	0	
		157	156.923 956 (4)	15.65 (3)	3/2	− 0.337 26 (55)*	+ 136 (2)*
		158	157.924 019 (4)	24.84 (12)	0	0	
		160	159.927 049 (4)	21.86 (4)	0	0	
65	Tb	159	158.925 342 (4)	100	3/2	+ 2.014 (4)	+ 143.2 (8)
66	Dy	156	155.924 277 (8)	0.06 (1)	0	0	
		158	157.924 403 (5)	0.10 (1)	0	0	
		160	159.925 193 (4)	2.34 (6)	0	0	
		161	160.926 930 (4)	18.9 (2)	5/2	− 0.4803 (25)*	+ 250.7 (20)*
		162	161.926 795 (4)	25.5 (2)	0	0	
		163	162.928 728 (4)	24.9 (2)	5/2	+ 0.6726 (35)	+ 264.8 (21)
		164	163.929 171 (4)	28.2 (2)	0	0	
67	Ho	165	164.930 319 (4)	100	7/2	+ 4.173 (27)	+ 349 (3)*
68	Er	162	161.928 775 (4)	0.14 (1)	0	0	
		164	163.929 198 (4)	1.61 (1)	0	0	
		166	165.930 290 (4)	33.6 (2)	0	0	
		167	166.932 046 (4)	22.95 (15)	7/2	− 0.563 85 (12)	+ 356.5 (29)
		168	167.932 368 (4)	26.8 (2)	0	0	
		170	169.935 461 (4)	14.9 (2)	0	0	
69	Tm	169	168.934 212 (4)	100	1/2	− 0.2316 (15)	
70	Yb	168	167.933 894 (5)	0.13 (1)	0	0	
		170	169.934 759 (4)	3.05 (6)	0	0	
		171	170.936 323 (3)	14.3 (2)	1/2	+ 0.493 67 (1)*	
		172	171.936 378 (3)	21.9 (3)	0	0	
		173	172.938 208 (3)	16.12 (21)	5/2	− 0.679 89 (3)*	+ 280 (4)
		174	173.938 859 (3)	31.8 (4)	0	0	
		176	175.942 564 (4)	12.7 (2)	0	0	
71	Lu	175	174.940 770 (3)	97.41 (2)	7/2	+ 2.2327 (11)*	+ 349 (2)*
		176#	175.942 679 (3)	2.59 (2)	7	+ 3.1692 (45)*	+ 492 (3)*
72	Hf	174	173.940 044 (4)	0.162 (3)	0	0	
		176	175.941 406 (4)	5.206 (5)	0	0	
		177	176.943 217 (3)	18.606 (4)	7/2	+ 0.7935 (6)	+ 336.5 (29)*
		178	177.943 696 (3)	27.297 (4)	0	0	
		179	178.945 8122 (29)	13.629 (6)	9/2	− 0.6409 (13)	+ 379.3 (33)*
		180	179.946 5457 (30)	35.100 (7)	0	0	
73	Ta	180	179.947 462 (4)	0.012 (2)	8		
		181	180.947 992 (3)	99.988 (2)	7/2	+ 2.3705 (7)	+ 328 (6)*

Z	Symbol	A	Atomic mass, m_a (u)	Isotopic abundance, $100\,x$	Nuclear spin, I	Magnetic moment, m (μ_N)	Quadrupole moment, Q (fm^2)
74	W	180	179.946 701 (5)	0.13 (4)	0	0	
		182	181.948 202 (3)	26.3 (2)	0	0	
		183	182.950 220 (3)	14.3 (1)	1/2	+ 0.117 784 76 (9)	
		184	183.950 928 (3)	30.67 (15)	0	0	
		186	185.954 357 (4)	28.6 (2)	0	0	
75	Re	185	184.952 951 (3)	37.40 (2)	5/2	+ 3.1871 (3)	+ 218 (2)*
		187#	186.955 744 (3)	62.60 (2)	5/2	+ 3.2197 (3)	+ 207 (2)*
76	Os	184	183.952 488 (4)	0.02 (1)	0	0	
		186	185.953 830 (4)	1.58 (30)	0	0	
		187	186.955 741 (3)	1.6 (3)	1/2	+ 0.064 651 89 (6)	
		188	187.955 830 (3)	13.3 (7)	0	0	
		189	188.958 137 (4)	16.1 (8)	3/2	+ 0.659 933 (4)	+ 85.6 (28)
		190	189.958 436 (4)	26.4 (12)	0	0	
		192	191.961 467 (4)	41.0 (8)	0	0	
77	Ir	191	190.960 584 (4)	37.3 (5)	3/2	+ 0.1507 (6)*	+ 81.6 (9)*
		193	192.962 917 (4)	62.7 (5)	3/2	+ 0.1637 (6)*	+ 75.1 (9)*
78	Pt	190	189.959 917 (7)	0.01 (1)	0	0	
		192	191.961 019 (5)	0.79 (6)	0	0	
		194	193.962 655 (4)	32.9 (6)	0	0	
		195	194.964 766 (4)	33.8 (6)	1/2	+ 0.609 52 (6)	
		196	195.964 926 (4)	25.3 (6)	0	0	
		198	197.967 869 (6)	7.2 (2)	0	0	
79	Au	197	196.966 543 (4)	100	3/2	+ 0.148 158 (8)*	+ 54.7 (16)*
80	Hg	196	195.965 807 (5)	0.15 (1)	0	0	
		198	197.966 743 (4)	9.97 (8)	0	0	
		199	198.968 254 (4)	16.87 (10)	1/2	+ 0.505 885 49 (85)	
		200	199.968 300 (4)	23.10 (16)	0	0	
		201	200.970 277 (4)	13.18 (8)	3/2	− 0.560 2257 (14)*	+ 38.5 (40)*
		202	201.970 617 (4)	29.86 (20)	0	0	
		204	203.973 467 (5)	6.87 (4)	0	0	
81	Tl	203	202.972 320 (5)	29.524 (14)	1/2	+ 1.622 257 87 (12)	
		205	204.974 401 (5)	70.476 (14)	1/2	+ 1.638 214 61 (12)	
82	Pb	204	203.973 020 (5)	1.4 (1)	0	0	
		206	205.974 440 (4)	24.1 (1)	0	0	
		207	206.975 872 (4)	22.1 (1)	1/2	+ 0.582 583 (9)*	
		208	207.976 627 (4)	52.4 (1)	0	0	
83	Bi	209	208.980 374 (5)	100	9/2	+ 4.1106 (2)	− 37.0 (26)*
84	Po	209*	208.982 404 (5)		1/2		
85	At	210*	209.987 126 (12)				
86	Rn	222*	222.017 571 (3)		0	0	
87	Fr	223*	223.019 733 (4)		3/2	+ 1.17 (2)	+ 117 (1)
88	Ra	226*	226.025 403 (3)		0	0	
89	Ac	227*	227.027 750 (3)		3/2	+ 1.1 (1)	+ 170 (20)
90	Th	232#	232.038 0508 (23)	100	0	0	
91	Pa	231*	231.035 880 (3)		3/2	2.01 (2)	− 172 (5)

Z	Symbol	A	Atomic mass, m_a (u)	Isotopic abundance, $100\,x$	Nuclear spin, I	Magnetic moment, m (μ_N)	Quadrupole moment, Q (fm^2)
92	U	233*	233.039 628 (3)		5/2	0.59 (5)	+ 366.3 (8)
		234#	234.040 9468 (24)	0.0055 (5)	0	0	
		235#	235.043 9242 (24)	0.7200 (12)	7/2	− 0.38 (3)*	+ 455 (9)*
		238#	238.050 7847 (23)	99.2745 (60)	0	0	
93	Np	237*	237.048 1678 (23)		5/2	+ 3.14 (4)	+ 388.6 (6)
94	Pu	244*	244.064 199 (5)		0		
95	Am	243*	243.061 375 (3)		5/2	+ 1.61 (4)	+ 420 (130)
96	Cm	247*	247.070 347 (5)				
97	Bk	247*	247.070 300 (6)				
98	Cf	251*	251.079 580 (5)				
99	Es	252*	252.082 944 (23)				
100	Fm	257*	257.095 099 (8)				
101	Md	258*	258.098 57 (22)				
102	No	259*	259.100 931 (12)				
103	Lr	260*	260.105 320 (60)				
104	Unq	261*	261.108 69 (22)				
105	Unp	262*	262.113 76 (16)				
106	Unh	263*	263.118 22 (13)				
107	Uns	262*	263.122 93 (45)				
108	Uno	265*	265.130 16 (99)				
109	Une	266*	266.137 64 (45)				

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