

PERIODIC TABLE

Atomic Properties of the Elements

Group 1 IA		Frequently used fundamental physical constants										Physical Measurement Laboratory www.nist.gov/pml						Standard Reference Data www.nist.gov/srd						18 VIIIA												
Period	1	<p>For the most accurate values of these and other constants, visit physics.nist.gov/constants</p> <p>1 second = 9 192 631 770 periods of radiation corresponding to the transition between the two hyperfine levels of the ground state of ¹³³Cs</p> <p>speed of light in vacuum c 299 792 458 m s⁻¹ (exact)</p> <p>Planck constant h 6.626 07 × 10⁻³⁴ J s ($h = h/2\pi$)</p> <p>elementary charge e 1.602 177 × 10⁻¹⁹ C</p> <p>electron mass m_e 9.109 38 × 10⁻³¹ kg</p> <p>proton mass m_p 1.672 622 × 10⁻²⁷ kg</p> <p>fine-structure constant α 1/137.035 999</p> <p>Rydberg constant R_∞ 10 973 731.569 m⁻¹</p> <p>Boltzmann constant k 1.380 6 × 10⁻²³ J K⁻¹</p>										<ul style="list-style-type: none"> Solids Liquids Gases Artificially Prepared 						13 14 15 16 17 IIIA IVA VA VIA VIIA 5 6 7 8 9 2P _{1/2} 2P ₀ 4S _{3/2} 3P ₂ 2P _{3/2} B C N O F Ne Boron Carbon Nitrogen Oxygen Fluorine Neon 10.81* 12.011* 14.007* 15.999* 18.9984032 1s ² 2s ² 2p 1s ² 2s ² 2p ² 1s ² 2s ² 2p ³ 1s ² 2s ² 2p ⁴ 1s ² 2s ² 2p ⁵ 1s ² 2s ² 2p ⁶ 8.2980 11.2603 14.5341 13.6181 17.4228 21.5645						2 He Helium 4.002602 1s ² 24.5874												
	3 Li Lithium 6.94* 1s ² 2s 5.3917		4 Be Beryllium 9.012182 1s ² 2s ² 9.3227		3		4		5		6							7		8		9		10		11		12		13		14		15		16
	11 Na Sodium 22.98976928 [Ne]3s 5.1391		12 Mg Magnesium 24.3050 [Ne]3s ² 7.6462		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	19 K Potassium 39.0983 [Ar]4s 4.3407		20 Ca Calcium 40.078 [Ar]4s ² 6.1132		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	37 Rb Rubidium 85.4678 [Kr]5s 4.1771		38 Sr Strontium 87.62 [Kr]5s ² 5.6949		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	55 Cs Cesium 132.9054519 [Xe]6s 3.8939		56 Ba Barium 137.327 [Xe]6s ² 5.2117		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	87 Fr Francium (223) [Rn]7s 4.0727		88 Ra Radium (226) [Rn]7s ² 5.2784		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	72 Hf Hafnium 178.49 [Xe]4f ¹⁴ 5d ⁴ 6s ² 6.8251		73 Ta Tantalum 180.94788 [Xe]4f ¹⁴ 5d ³ 6s ² 7.5496		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	104 Rf Rutherfordium (261) [Rn]5f ¹⁴ 6d ⁴ 7s ² 6.01		105 Db Dubnium (268) [Rn]5f ¹⁴ 6d ³ 7s ² 6.8		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	57 La Lanthanum 138.90547 [Xe]5d ¹ 6s ² 5.5769		58 Ce Cerium 140.116 [Xe]4f ¹ 6s ² 5.5386		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	89 Ac Actinium (227) [Rn]6d ¹ 7s ² 5.3802		90 Th Thorium 232.03806 [Rn]6d ² 7s ² 6.3067		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	61 Pm Promethium (145) [Xe]4f ⁶ 6s ² 5.582		62 Sm Samarium 150.36 [Xe]4f ⁶ 6s ² 5.6437		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	93 Np Neptunium (237) [Rn]5f ⁶ 7s ² 6.2655		94 Pu Plutonium (244) [Rn]5f ⁷ 7s ² 6.0258		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	65 Tb Terbium 158.92535 [Xe]4f ⁹ 6s ² 5.8338		66 Dy Dysprosium 162.500 [Xe]4f ¹⁰ 6s ² 5.9391		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
97 Bk Berkelium (247) [Rn]5f ⁹ 7s ² 6.1978		98 Cf Californium (251) [Rn]5f ¹⁰ 7s ² 6.2817		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		
67 Er Erbium 167.259 [Xe]4f ¹² 6s ² 6.1077		68 Ho Holmium 164.93032 [Xe]4f ¹¹ 6s ² 6.0215		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		
101 Lr Lawrencium (262) [Rn]5f ¹⁴ 7s ² 7p 4.90		102 No Nobelium (259) [Rn]5f ¹⁴ 7s ² 6.65		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		
69 Tm Thulium 168.93421 [Xe]4f ¹³ 6s ² 6.1843		70 Yb Ytterbium 173.054 [Xe]4f ¹⁴ 6s ² 6.2542		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		
103 Lr Lawrencium (262) [Rn]5f ¹⁴ 7s ² 7p 4.90		104 No Nobelium (259) [Rn]5f ¹⁴ 7s ² 6.65		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		

58 ¹G₄

Ce

Cerium

140.116

[Xe]4f¹6s²

5.5386

Ground-state Configuration: [Xe]4f¹6s²

Ionization Energy (eV): 5.5386

Atomic Number: 58

Ground-state Level: ¹G₄

Symbol: Ce

Name: Cerium

Standard Atomic Weight: 140.116

[†]Based upon ¹²C. () indicates the mass number of the longest-lived isotope. *IUPAC conventional atomic weights; standard atomic weights for these elements are expressed in intervals; see iupac.org for an explanation and values. For a description of the data, visit physics.nist.gov/data

PERIODIC TABLE OF THE ELEMENTS

1 IA																	18 VIIIA	
1 H Hydrogen 1.0079	2 IIA		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center;">14 ← Group IUPAC IVA ← Group CAS</p> <p>Atomic Number → 6 ← Selected Oxidation States Symbol → C ← Name → Carbon Electron Configuration → 2-4 ← Atomic Mass</p> </div>										13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	2 He Helium 4.0026
2 Li Lithium 6.941	4 Be Beryllium 9.0122											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.179	
3 Na Sodium 22.990	12 Mg Magnesium 24.305	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8 VIII	9 VIII	10 VIII	11 IB	12 IIB	13 Al Aluminium 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulphur 32.065	17 Cl Chlorine 35.453	18 Ar Argon 39.948	
4 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.723	32 Ge Germanium 72.64	33 As Arsenic 74.922	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80	
5 Rb Rubidium 85.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.91	46 Pd Palladium 106.42	47 Ag Silver 107.87	48 Cd Cadmium 112.41	49 In Indium 114.82	50 Sn Tin 118.71	51 Sb Antimony 121.76	52 Te Tellurium 127.60	53 I Iodine 126.90	54 Xe Xenon 131.29	
6 Cs Cesium 132.91	56 Ba Barium 137.33	57-71 La Lanthanide	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.84	75 Re Rhenium 186.21	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.97	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)	
7 Fr Francium (223)	88 Ra Radium (226)	89-103 Ac Actinide	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (266)	107 Bh Bohrium (264)	108 Hs Hassium (277)	109 Mt Meitnerium (278)	110 Uun Ununnilium (281)	111 Uuu Unununium (282)	112 Uub Ununbium (285)	113 Uut Ununtrium (284)	114 Uuq Ununquadium (289)	115 Uup Ununpentium (288)	116 Uuh Ununhexium (291)	117 Uus Ununseptium (294)	118 Uuo Ununoctium (294)	

Electron Shells

1	K	2	S	P	D	F
2	L	8	2	6		
3	M	18	2	6	10	
4	N	32	2	6	10	14
5	O	32	2	6	10	14
6	P	18	2	6	10	
7	Q	8	2	6		
8	R	2	2			

Lanthanide

57 La Lanthanum 138.91	58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.96	64 Gd Gadolinium 157.25	65 Tb Terbium 158.93	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93	68 Er Erbium 167.26	69 Tm Thulium 168.93	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.97
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Actinide

89 Ac Actinium (227)	90 Th Thorium 232.04	91 Pa Protactinium 231.04	92 U Uranium 238.03	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)
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