

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						Group 18 VIII A																			
1 H Hydrogen 1.008* 1s 13.5984		<p>For the most accurate values of these and other constants, visit <a href="http://physics.nist.gov/constants">physics.nist.gov/constants</a></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 <sup>133</sup>Cs</p> <p>speed of light in vacuum <i>c</i> 299 792 458 m s<sup>-1</sup> (exact)</p> <p>Planck constant <i>h</i> 6.626 07 x 10<sup>-34</sup> J s (<i>h</i> = <i>h</i>/2π)</p> <p>elementary charge <i>e</i> 1.602 177 x 10<sup>-19</sup> C</p> <p>electron mass <i>m<sub>e</sub></i> 9.109 38 x 10<sup>-31</sup> kg</p> <p><i>m<sub>e</sub>c<sup>2</sup></i> 0.511 999 MeV</p> <p>proton mass <i>m<sub>p</sub></i> 1.672 622 x 10<sup>-27</sup> kg</p> <p>fine-structure constant <i>α</i> 1/137.035 999</p> <p>Rydberg constant <i>R<sub>∞</sub></i> 10 973 731.569 m<sup>-1</sup></p> <p><i>R<sub>∞</sub>hc</i> 3.289 841 960 x 10<sup>15</sup> Hz</p> <p><i>R<sub>∞</sub>hc</i> 13.605 69 eV</p> <p>Boltzmann constant <i>k</i> 1.380 6 x 10<sup>-23</sup> J K<sup>-1</sup></p>										5 B Boron 10.81* 1s <sup>2</sup> 2s <sup>2</sup> 2p 11.2603						6 C Carbon 12.011* 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>2</sup> 14.5341						7 N Nitrogen 14.007* 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>3</sup> 14.5341						8 O Oxygen 15.999* 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>4</sup> 17.4228						9 F Fluorine 18.99840316 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>5</sup> 17.4228						10 Ne Neon 20.1797 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 21.5645	
2 IIA		3 IIIB		4 IVB		5 VB		6 VIB		7 VIIB		8 VIII						9 IB		10 IIB		11 IIIA		12 IVA		13 VA		14 VIA		15 VIIA		16 He Helium 4.002602 1s <sup>2</sup> 24.5874											
3 Na Sodium 22.98976928 [Ne]3s 5.1391		4 Mg Magnesium 24.305* [Ne]3s <sup>2</sup> 7.6462		11 Li Lithium 6.94* 1s <sup>2</sup> 2s 5.3917		12 Be Beryllium 9.0121831 1s <sup>2</sup> 2s <sup>2</sup> 9.3227		19 K Potassium 39.0983 [Ar]4s 4.3407		20 Ca Calcium 40.078 [Ar]4s <sup>2</sup> 6.1132		21 Sc Scandium 44.955908 [Ar]3d <sup>4</sup> 4s <sup>2</sup> 6.5615		22 Ti Titanium 47.867 [Ar]3d <sup>2</sup> 4s <sup>2</sup> 6.8281		23 V Vanadium 50.9415 [Ar]3d <sup>3</sup> 4s <sup>2</sup> 6.7462		24 Cr Chromium 51.9961 [Ar]3d <sup>5</sup> 4s 7.1194		25 Mn Manganese 54.938044 [Ar]3d <sup>5</sup> 4s <sup>2</sup> 7.4340		26 Fe Iron 55.845 [Ar]3d <sup>6</sup> 4s <sup>2</sup> 7.9025		27 Co Cobalt 58.933194 [Ar]3d <sup>7</sup> 4s <sup>2</sup> 7.8810		28 Ni Nickel 58.6934 [Ar]3d <sup>8</sup> 4s <sup>2</sup> 7.6399		29 Cu Copper 63.546 [Ar]3d <sup>10</sup> 4s 7.7264		30 Zn Zinc 65.38 [Ar]3d <sup>10</sup> 4s <sup>2</sup> 9.3942		31 Ga Gallium 69.723 [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p 5.9993		32 Ge Germanium 72.630 [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p <sup>2</sup> 7.8994		33 As Arsenic 74.921595 [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p <sup>3</sup> 7.8866		34 Se Selenium 78.971 [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p <sup>4</sup> 9.7524		35 Br Bromine 79.904* [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p <sup>5</sup> 11.8138		36 Kr Krypton 83.798 [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p <sup>6</sup> 13.9996	
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### The Hubbard Chart of the Atoms, ca. 1924

Henry D. Hubbard, the designer of the “Chart of the Atoms,” was the first secretary of the National Institute of Standards and Technology (then-called the National Bureau of Standards) and served continuously in that capacity from 1901 until his retirement in 1938. Secretary Hubbard made a contribution to instruction in physics that is still in use today, his modernization of Mendeleev’s periodic table. First constructed in the 1920s, it has been frequently revised and reprinted.

