

|                   |                   |                    |                    |                    |                    |                    |                    |                    |                     |                     |                     |                   |                     |                   |                   |                   |                     |
|-------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|-------------------|---------------------|-------------------|-------------------|-------------------|---------------------|
| 1<br>H<br>1.008   |                   |                    |                    |                    |                    |                    |                    |                    |                     |                     |                     |                   |                     |                   |                   | 2<br>He<br>4.003  |                     |
| 3<br>Li<br>6.941  | 4<br>Be<br>9.012  |                    |                    |                    |                    |                    |                    |                    |                     |                     |                     | 5<br>B<br>10.81   | 6<br>C<br>12.01     | 7<br>N<br>14.01   | 8<br>O<br>16.00   | 9<br>F<br>19.00   | 10<br>Ne<br>20.18   |
| 11<br>Na<br>22.99 | 12<br>Mg<br>24.31 |                    |                    |                    |                    |                    |                    |                    |                     |                     |                     | 13<br>Al<br>26.58 | 14<br>Si<br>28.09   | 15<br>P<br>30.97  | 16<br>S<br>32.07  | 17<br>Cl<br>35.45 | 18<br>Ar<br>39.95   |
| 19<br>K<br>39.10  | 20<br>Ca<br>40.08 | 21<br>Sc<br>44.96  | 22<br>Ti<br>47.87  | 23<br>V<br>50.94   | 24<br>Cr<br>52.00  | 25<br>Mn<br>54.94  | 26<br>Fe<br>55.85  | 27<br>Co<br>58.93  | 28<br>Ni<br>58.69   | 29<br>Cu<br>63.55   | 30<br>Zn<br>65.39   | 31<br>Ga<br>69.72 | 32<br>Ge<br>72.61   | 33<br>As<br>74.92 | 34<br>Se<br>78.96 | 35<br>Br<br>79.90 | 36<br>Kr<br>83.80   |
| 37<br>Rb<br>85.47 | 38<br>Sr<br>87.62 | 39<br>Y<br>88.91   | 40<br>Zr<br>91.22  | 42<br>Nb<br>92.91  | 42<br>Mo<br>95.94  | 43<br>Tc<br>(98)   | 44<br>Ru<br>101.1  | 45<br>Rh<br>102.9  | 46<br>Pd<br>106.4   | 47<br>Ag<br>107.9   | 48<br>Cd<br>112.4   | 49<br>In<br>114.8 | 50<br>Sn<br>118.7   | 51<br>Sb<br>121.8 | 52<br>Te<br>127.6 | 53<br>I<br>126.9  | 54<br>Xe<br>131.3   |
| 55<br>Cs<br>132.9 | 56<br>Ba<br>137.3 | 71<br>Lu<br>175.0  | 72<br>Hf<br>178.5  | 73<br>Ta<br>181.0  | 74<br>W<br>183.8   | 75<br>Re<br>186.2  | 76<br>Os<br>190.2  | 77<br>Ir<br>192.2  | 78<br>Pt<br>195.1   | 79<br>Au<br>197.0   | 80<br>Hg<br>200.6   | 81<br>Tl<br>204.4 | 82<br>Pb<br>207.2   | 83<br>Bi<br>209.0 | 84<br>Po<br>(209) | 85<br>At<br>(210) | 86<br>Rn<br>(222)   |
| 87<br>Fr<br>(223) | 88<br>Ra<br>(226) | 103<br>Lr<br>(262) | 104<br>Rf<br>(261) | 105<br>Db<br>(262) | 106<br>Sg<br>(266) | 107<br>Bh<br>(264) | 108<br>Hs<br>(269) | 109<br>Mt<br>(268) | 110<br>Uun<br>(271) | 111<br>Uuu<br>(272) | 112<br>Uub<br>(277) | 113<br>?<br>(?)   | 114<br>Uuq<br>(289) | 115<br>?<br>(?)   | 116<br>?<br>(?)   | 117<br>?<br>(?)   | 118<br>Uuo<br>(277) |

|                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                          |                           |                           |                           |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|
| 57<br><b>La</b><br>138.9 | 58<br><b>Ce</b><br>140.1 | 59<br><b>Pr</b><br>140.9 | 60<br><b>Nd</b><br>144.2 | 61<br><b>Pm</b><br>(145) | 62<br><b>Sm</b><br>150.4 | 63<br><b>Eu</b><br>152.0 | 64<br><b>Gd</b><br>157.3 | 65<br><b>Tb</b><br>158.9 | 66<br><b>Dy</b><br>162.5 | 67<br><b>Ho</b><br>164.9 | 68<br><b>Er</b><br>167.3  | 69<br><b>Tm</b><br>168.9  | 70<br><b>Yb</b><br>173.1  |
| 89<br><b>Ac</b><br>(227) | 90<br><b>Th</b><br>232.0 | 91<br><b>Pa</b><br>231.0 | 92<br><b>U</b><br>238.0  | 93<br><b>Np</b><br>(237) | 94<br><b>Pu</b><br>(244) | 95<br><b>Am</b><br>(243) | 96<br><b>Cm</b><br>(247) | 97<br><b>Bk</b><br>(247) | 98<br><b>Cf</b><br>(251) | 99<br><b>Es</b><br>(252) | 100<br><b>Fm</b><br>(257) | 101<br><b>Md</b><br>(258) | 102<br><b>No</b><br>(259) |