




|                    |   |                    |                     |                     |                      |                     |                     |                     |                     |                     |                      |                     |                      |                     |                     |                     |                     |                   |                   |                    |                    |  |  |  |  |
|--------------------|---|--------------------|---------------------|---------------------|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|---------------------|----------------------|---------------------|---------------------|---------------------|---------------------|-------------------|-------------------|--------------------|--------------------|--|--|--|--|
| 1<br>H<br>1.008    | <div>  <div> <i>Begeisterung<br/>Begabung<br/>fördern!</i> </div> </div> |                    |                     |                     |                      |                     |                     |                     |                     |                     |                      |                     |                      |                     |                     |                     | 2<br>He<br>4.003    |                   |                   |                    |                    |  |  |  |  |
| 3<br>Li<br>6.941   | 4<br>Be<br>9.012  |                    |                     |                     |                      |                     |                     |                     |                     |                     |                      |                     |                      |                     |                     | 5<br>B<br>10.811    | 6<br>C<br>12.011    | 7<br>N<br>14.007  | 8<br>O<br>15.999  | 9<br>F<br>18.988   | 10<br>Ne<br>20.180 |  |  |  |  |
| 11<br>Na<br>22.990 | 12<br>Mg<br>24.305  |                    |                     |                     |                      |                     |                     |                     |                     |                     |                      |                     |                      |                     |                     | 13<br>Al<br>26.982  | 14<br>Si<br>28.086  | 15<br>P<br>30.974 | 16<br>S<br>32.065 | 17<br>Cl<br>35.453 | 18<br>Ar<br>39.948 |  |  |  |  |
| 19<br>K<br>39.098  | 20<br>Ca<br>40.078  | 21<br>Sc<br>44.956 | 22<br>Ti<br>47.867  | 23<br>V<br>50.942   | 24<br>Cr<br>51.996   | 25<br>Mn<br>54.938  | 26<br>Fe<br>55.845  | 27<br>Co<br>58.933  | 28<br>Ni<br>58.693  | 29<br>Cu<br>63.546  | 30<br>Zn<br>65.38(2) | 31<br>Ga<br>69.723  | 32<br>Ge<br>72.630   | 33<br>As<br>74.922  | 34<br>Se<br>78.971  | 35<br>Br<br>79.904  | 36<br>Kr<br>83.798  |                   |                   |                    |                    |  |  |  |  |
| 37<br>Rb<br>85.468 | 38<br>Sr<br>87.62(1)  | 39<br>Y<br>88.906  | 40<br>Zr<br>91.224  | 41<br>Nb<br>92.906  | 42<br>Mo<br>95.96(1) | 43<br>Tc*<br>(98)   | 44<br>Ru<br>101.07  | 45<br>Rh<br>102.91  | 46<br>Pd<br>106.42  | 47<br>Ag<br>107.87  | 48<br>Cd<br>112.41   | 49<br>In<br>114.82  | 50<br>Sn<br>118.71   | 51<br>Sb<br>121.76  | 52<br>Te<br>127.60  | 53<br>I<br>126.90   | 54<br>Xe<br>131.29  |                   |                   |                    |                    |  |  |  |  |
| 55<br>Cs<br>132.91 | 56<br>Ba<br>137.33  | 57<br>La<br>138.91 | 72<br>Hf<br>178.49  | 73<br>Ta<br>180.95  | 74<br>W<br>183.84    | 75<br>Re<br>186.21  | 76<br>Os<br>190.23  | 77<br>Ir<br>192.22  | 78<br>Pt<br>195.08  | 79<br>Au<br>196.97  | 80<br>Hg<br>200.59   | 81<br>Tl<br>204.38  | 82<br>Pb<br>207.2(1) | 83<br>Bi*<br>208.98 | 84<br>Po*<br>(209)  | 85<br>At*<br>(210)  | 86<br>Rn*<br>(222)  |                   |                   |                    |                    |  |  |  |  |
| 87<br>Fr*<br>(223) | 88<br>Ra*<br>226.03   | 89<br>Ac*<br>(227) | 104<br>Rf*<br>(267) | 105<br>Db*<br>(268) | 106<br>Sg*<br>(269)  | 107<br>Bh*<br>(270) | 108<br>Hs*<br>(270) | 109<br>Mt*<br>(278) | 110<br>Ds*<br>(281) | 111<br>Rg*<br>(282) | 112<br>Cn*<br>(285)  | 113<br>Nh*<br>(286) | 114<br>Fl*<br>(289)  | 115<br>Mc*<br>(290) | 116<br>Lv*<br>(293) | 117<br>Ts*<br>(294) | 118<br>Og*<br>(294) |                   |                   |                    |                    |  |  |  |  |
| Lanthanoide        |   |                    | 58<br>Ce<br>140.12  | 59<br>Pr<br>140.91  | 60<br>Nd<br>144.24   | 61<br>Pm*<br>(145)  | 62<br>Sm<br>150.36  | 63<br>Eu<br>151.96  | 64<br>Gd<br>157.25  | 65<br>Tb<br>158.93  | 66<br>Dy<br>162.50   | 67<br>Ho<br>164.93  | 68<br>Er<br>167.26   | 69<br>Tm<br>168.93  | 70<br>Yb<br>173.05  | 71<br>Lu<br>174.97  |                     |                   |                   |                    |                    |  |  |  |  |
| Actinoide          |   |                    | 90<br>Th*<br>232.04 | 91<br>Pa*<br>231.04 | 92<br>U*<br>238.03   | 93<br>Np*<br>(237)  | 94<br>Pu*<br>(244)  | 95<br>Am*<br>(243)  | 96<br>Cm*<br>(247)  | 97<br>Bk*<br>(247)  | 98<br>Cf*<br>(251)   | 99<br>Es*<br>(252)  | 100<br>Fm*<br>(257)  | 101<br>Md*<br>(258) | 102<br>No*<br>(259) | 103<br>Lr*<br>(266) |                     |                   |                   |                    |                    |  |  |  |  |

|                         |  |                          |  |
|-------------------------|--|--------------------------|--|
| molare Masse            | $M = \frac{m}{n}$  | Gibbs-Helmholtz          | $\Delta_R G = \Delta_R H - T \cdot \Delta_R S$   |
| molares Volumen         | $V_m = \frac{V}{n} = \frac{M}{\rho}$   | Arrhenius                | $k = A \cdot \exp\left(-\frac{E_A}{R \cdot T}\right)$                                    |
| molare Konzentration    | $c = \frac{n}{V}$  | Nernst                   | $E = E^0 + \frac{R \cdot T}{z \cdot F} \cdot \ln\left(\frac{[A_{ox}]}{[A_{red}]}\right)$ |
| Ideale Gasgleichung     | $p \cdot V = n \cdot R \cdot T$  | Henderson-Hasselbalch    | $pH = pK_a + \log\left(\frac{[A^-]}{[HA]}\right)$  |
| Gaskonstante            | $R = 8,314 \text{ J K}^{-1} \text{ mol}^{-1}$                                | Lambert-Beersches Gesetz | $E = \log\left(\frac{I_0}{I}\right) = \varepsilon \cdot c \cdot d$                       |
| Gleichgewichtskonstante | $K = \frac{k_{hin}}{k_{rück}} = \frac{[C]^c \cdot [D]^d}{[A]^a \cdot [B]^b}$ | Faradaysches Gesetz      | $Q = I \cdot t = z \cdot n \cdot F$  |
| Freie Enthalpie         | $\Delta_R G^0 = -R \cdot T \cdot \ln(K)$                                     | Zellpotential            | $\Delta E = -\frac{\Delta_R G}{z \cdot F}$   |
| Avogadro-Konstante      | $N_A = 6,022 \cdot 10^{23} \text{ mol}^{-1}$                                 | Faraday-Konstante        | $F = 96485,31 \text{ C mol}^{-1}$  |



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