

# Das Periodensystem der Elemente

Alkalimetalle Erdalkalimetalle Lanthanoide Actinoide Übergangsmetalle Metalle Halbmetalle Nichtmetalle Edelgase Unbekannt Gruppe 17 = Halogene

<b>1-IA</b>	<b>2-IIA</b>
<b>1 H</b> Wasserstoff 1.00794 -1.1 52.9/154 1.20 13.99/20.27 g, H <sub>2</sub> , H 1s <sup>2</sup> hex	<b>2 He</b> Helium 4.002602(2) - 31/- 0.95/4.222 g, He 1s <sup>2</sup> hcp
<b>3 Li</b> Lithium 6.941 0.98 167/90 453.65/1603 s, Li, Li <sup>+</sup> 1s <sup>2</sup> 2s <sup>1</sup> bcc	<b>4 Be</b> Beryllium 9.0121831(5) 1.57 112/59 1560/2742 s, Be, Be <sup>2+</sup> 1s <sup>2</sup> 2s <sup>2</sup> hcp
<b>11 Na</b> Natrium 22.98976928(2) 1 190/116 370.94/1156.09 s, Na, Na <sup>+</sup> [Ne]3s <sup>1</sup> bcc	<b>12 Mg</b> Magnesium 24.305 1.31 145/86 1913/1363 s, Mg, Mg <sup>2+</sup> [Ne]3s <sup>2</sup> hcp

**Schlüssel**

**group**  
# .....  
Xy .....  
Atomname .....  
MW .....  
ox. no. ....  
EN .....  
r<sub>a</sub>/r<sub>i</sub> .....  
m.p./b.p. ....  
p.Xy<sub>gr</sub>Xy<sub>fl</sub> .....  
el. conf. ....

**Atomname**  
MW .....  
ox. no. ....  
EN .....  
r<sub>a</sub> .....  
r<sub>i</sub> .....  
m.p. ....  
b.p. ....  
p. ....  
Xy<sub>gr</sub> .....  
Xy<sub>fl</sub> .....  
el. conf. ....  
abc .....  
\*Werte bei STP (273.15 K, 1 bar)

**Hinweis:** Grau geschriebene Werte sind Schätzungen  
# ..... Ordnungszahl  
Xy ..... Symbol  
Atomname ..... Schwarz geschrieben:  
synthetisches Atom.  
MW ..... Molekülmasse (g/mol)  
ox. no. .... Häufige Oxidationszahlen  
EN ..... Elektronegativität (Pauling)  
r<sub>a</sub> ..... Atomradius (pm)  
r<sub>i</sub> ..... Ionenradius (pm)  
m.p. .... Schmelzpunkt (K)\*  
b.p. .... Siedepunkt (K)\*  
p. .... Phasen\*  
solid (s), flüssigkeit (l), gas (g)  
Xy<sub>gr</sub> ..... Ion entsprechend zu r<sub>i</sub>  
Xy<sub>fl</sub> ..... Grundform  
el. conf. .... Elektronenkonfiguration  
abc ..... Kristallstruktur

**Gleichungen:**  
Konzentration: c = n/V [mol/L]  
Stoffmenge: n [mol]  
Volumen: V [L]  
Teilchenzahl: N = n · N<sub>A</sub>  
Druck: p [Pa]  
Ideale Gasgleichung: pV = nRT = Nk<sub>B</sub>T

**Umrechnungsfaktoren:**  
1 μm = 10<sup>-6</sup> m; 1 nm = 10<sup>-9</sup> m; 1 Å (Angs.) = 10<sup>-10</sup> m; 1 pm = 10<sup>-12</sup> m; 1 fm = 10<sup>-15</sup> m  
1 bar = 10<sup>5</sup> N/m<sup>2</sup> = 10<sup>5</sup> Pa; 1 atm = 101325 Pa = 1.01325 bar  
Torr = 1/760 atm = 1.333 mbar = 1 mmHg  
1 L = 10<sup>-3</sup> m<sup>3</sup> = 1 dm<sup>3</sup> = 10<sup>3</sup> cm<sup>3</sup> = 10<sup>6</sup> mm<sup>3</sup>

**Konstanten:**  
Avogadro-Konstante N<sub>A</sub> = 6.022 141 79(30) · 10<sup>23</sup> mol<sup>-1</sup>  
Masse des Protons m<sub>p</sub> = 1.672 621 777(74) · 10<sup>-27</sup> kg  
Masse des Elektrons m<sub>e</sub> = 9.109 382 91(40) · 10<sup>-31</sup> kg  
Masse des Neutrons m<sub>n</sub> = 1.674 927 351(74) · 10<sup>-27</sup> kg  
Standardtemperatur T<sub>0</sub> = 273.15 K = 0 °C  
Gaskonstante R = 8.314 472(15) J/(mol·K)  
Boltzmann-Konstante k<sub>B</sub> = 1.380 650 4(24) · 10<sup>-23</sup> J/K  
Lichtgeschwindigkeit c = 2.997 924 58 · 10<sup>8</sup> m/s  
Elementarladung e = 1.602 176 487(40) · 10<sup>-19</sup> C  
Plancksches Wirkungsquantum h = 6.626 068 96(33) · 10<sup>-34</sup> J·s  
h/2π = ħ = 1.054 571 628(53) · 10<sup>-34</sup> J·s  
Atomare Masseneinheit 1 u = 1.660 538 921(73) · 10<sup>-27</sup> kg  
Die Atomare Masseneinheit ist gleich 1/12 der Masse eines einzelnen isolierten C-Atoms.

**bcc:** body centered cubic  
**cub:** cubic  
**dhcp:** double hexagonal close-packed  
**fcc:** face-centered cubic  
**fd:** face-centered diamond-cubic  
**hcp:** hexagonal closed-packed  
**hex:** hexagonal  
**mon:** monoclinic  
**ort:** orthorhombic  
**rho:** rhombohedral  
**she:** simple hexagonal

**3-IIIA** **4-IVA** **5-VA** **6-VIA** **7-VIIA** **8-VIIIA** **9-VIIIA** **10-VIIIA** **11-IB** **12-IIB**

<b>19 K</b> Kalium 39.0983(1) 0.82 243/152 336.1/1032 s, K, K <sup>+</sup> [Ar]4s <sup>1</sup> bcc	<b>20 Ca</b> Calcium 40.078(4) 1.00 194/114 1115/1757 s, Ca, Ca <sup>2+</sup> [Ar]4s <sup>2</sup> fcc	<b>21 Sc</b> Scandium 44.955908(5) 1.36 184/88.5 1814/3109 s, Sc, Sc <sup>3+</sup> [Ar]3d <sup>1</sup> 4s <sup>2</sup> hcp	<b>22 Ti</b> Titan 47.867(1) 1.54 176/74.5 1941/3560 s, Ti, Ti <sup>4+</sup> [Ar]3d <sup>2</sup> 4s <sup>2</sup> hcp	<b>23 V</b> Vanadium 50.9415(1) 1.63 171/68 2183/3680 s, V, V <sup>5+</sup> [Ar]3d <sup>3</sup> 4s <sup>2</sup> bcc	<b>24 Cr</b> Chrom 51.9961(6) 1.66 166/58 2180/2944 s, Cr, Cr <sup>6+</sup> [Ar]3d <sup>5</sup> 4s <sup>1</sup> bcc	<b>25 Mn</b> Mangan 54.938044(3) 1.55 161/60 1519/2334 s, Mn, Mn <sup>2+</sup> [Ar]3d <sup>5</sup> 4s <sup>2</sup> bcc	<b>26 Fe</b> Eisen 55.845(2) 1.83 156/39 1811/3134 s, Fe, Fe <sup>2+</sup> [Ar]3d <sup>6</sup> 4s <sup>2</sup> bcc	<b>27 Co</b> Cobalt 58.933194(4) 1.88 149/83 1728/3003 s, Co, Co <sup>2+</sup> [Ar]3d <sup>7</sup> 4s <sup>2</sup> fcc	<b>28 Ni</b> Nickel 58.6934(4) 1.91 145/87 1782/3003 s, Ni, Ni <sup>2+</sup> [Ar]3d <sup>8</sup> 4s <sup>2</sup> fcc	<b>29 Cu</b> Kupfer 63.546(3) 1.90 145/87 1357.77/2835 s, Cu, Cu <sup>2+</sup> [Ar]3d <sup>10</sup> 4s <sup>1</sup> fcc	<b>30 Zn</b> Zink 65.38(2) 1.65 142/88 692.68/1180 s, Zn, Zn <sup>2+</sup> [Ar]3d <sup>10</sup> 4s <sup>2</sup> hcp	<b>31 Ga</b> Gallium 69.723(1) 1.81 136/76 302.91/2673 s, Ga, Ga <sup>3+</sup> [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p <sup>1</sup> ort	<b>32 Ge</b> Germanium 72.630(8) 2.01 125/67 1211.40/3106 s, Ge, Ge <sup>4+</sup> [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p <sup>2</sup> fcd	<b>33 As</b> Arsen 74.921595(6) 2.18 114/72 887 (subl.) s, As, As <sup>3+</sup> [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p <sup>3</sup> rho	<b>34 Se</b> Selen 78.971(8) 2.55 103/184 494/958 s, Se, Se <sup>4+</sup> [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p <sup>4</sup> hex	<b>35 Br</b> Brom 79.904 2.96 162/81 265.8/332.0 l, Br <sub>2</sub> , Br <sup>-</sup> [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p <sup>5</sup> ort	<b>36 Kr</b> Krypton 83.798(2) 3.00 88/- 115.78/119.93 g, Kr [Ar]3d <sup>10</sup> 4s <sup>2</sup> 4p <sup>6</sup> fcc
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<b>37 Rb</b> Rubidium 85.4678(3) 0.82 265/166 301.7/944 s, Rb, Rb <sup>+</sup> [Kr]5s <sup>1</sup> bcc	<b>38 Sr</b> Strontium 87.62(1) 0.95 219/132 1000/1650 s, Sr, Sr <sup>2+</sup> [Kr]5s <sup>2</sup> fcc	<b>39 Y</b> Yttrium 88.90584(2) 1.22 212/104 1799/3203 s, Y, Y <sup>3+</sup> [Kr]4d <sup>1</sup> 5s <sup>2</sup> hcp	<b>40 Zr</b> Zirkonium 91.224(2) 1.33 206/86 2128/4650 s, Zr, Zr <sup>4+</sup> [Kr]4d <sup>2</sup> 5s <sup>2</sup> hcp	<b>41 Nb</b> Niob 92.90637(2) 1.60 198/78 2270/5017 s, Nb, Nb <sup>5+</sup> [Kr]4d <sup>4</sup> 5s <sup>1</sup> bcc	<b>42 Mo</b> Molybdän 95.95(1) 1.66 190/73 2896/4912 s, Mo, Mo <sup>6+</sup> [Kr]4d <sup>5</sup> 5s <sup>1</sup> bcc	<b>43 Tc</b> Technetium (98) 1.9 183/70 2430/4538 s, Tc, Tc <sup>7+</sup> [Kr]4d <sup>5</sup> 5s <sup>2</sup> hcp	<b>44 Ru</b> Ruthenium 101.07(2) 1.8 176/76 2719/4423 s, Ru, Ru <sup>3+</sup> [Kr]4d <sup>7</sup> 5s <sup>1</sup> hcp	<b>45 Rh</b> Rhodium 102.90550(2) 2.28 173/80.5 2371/3968 s, Rh, Rh <sup>3+</sup> [Kr]4d <sup>8</sup> 5s <sup>1</sup> fcc	<b>46 Pd</b> Palladium 106.42(1) 2.4 169/100 1828.05/3236 s, Pd, Pd <sup>2+</sup> [Kr]4d <sup>10</sup> fcc	<b>47 Ag</b> Silber 107.8682(2) 1 165/129 1519.29/2104 s, Ag, Ag <sup>+</sup> [Kr]4d <sup>10</sup> 5s <sup>1</sup> fcc	<b>48 Cd</b> Cadmium 112.414(4) 1.69 161/109 1609.22/1040 s, Cd, Cd <sup>2+</sup> [Kr]4d <sup>10</sup> 5s <sup>2</sup> hcp	<b>49 In</b> Indium 114.818(1) 1.78 156/94 429.75/2345 s, In, In <sup>3+</sup> [Kr]4d <sup>10</sup> 5s <sup>2</sup> 4p <sup>1</sup> tet	<b>50 Sn</b> Zinn 118.710(7) 1.96 145/88 903.73/1908 s, Sn, Sn <sup>2+</sup> [Kr]4d <sup>10</sup> 5s <sup>2</sup> 4p <sup>2</sup> fcd	<b>51 Sb</b> Antimon 121.760(1) 2.05 154/83 903.73/1908 s, Sb, Sb <sup>3+</sup> [Kr]4d <sup>10</sup> 5s <sup>2</sup> 4p <sup>3</sup> rho	<b>52 Te</b> Tellur 127.60(3) 2.1 123/207 723.66/1261 s, Te, Te <sup>4+</sup> [Kr]4d <sup>10</sup> 5s <sup>2</sup> 4p <sup>4</sup> hex	<b>53 I</b> Iod 126.90447(3) 2.66 115/206 265.8/332.0 s, I <sub>2</sub> [Kr]4d <sup>10</sup> 5s <sup>2</sup> 4p <sup>5</sup> ort	<b>54 Xe</b> Xenon 131.293(6) 2.6 108/- 161.40/165.05 g, Xe [Kr]4d <sup>10</sup> 5s <sup>2</sup> 4p <sup>6</sup> fcc
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<b>55 Cs</b> Caesium 132.90545196 0.79 298/181 301.7/944 s, Cs, Cs <sup>+</sup> [Xe]6s <sup>1</sup> bcc	<b>56 Ba</b> Barium 137.327(7) 0.89 253/149 1000/2118 s, Ba, Ba <sup>2+</sup> [Xe]6s <sup>2</sup> bcc	<b>57-71</b> Lanthanoide	<b>72 Hf</b> Hafnium 178.49(2) 1.30 208/85 2506/4876 s, Hf, Hf <sup>4+</sup> [Xe]4f <sup>14</sup> 5d <sup>2</sup> 6s <sup>2</sup> hcp	<b>73 Ta</b> Tantal 180.94788(2) 1.50 200/78 3290/5731 s, Ta, Ta <sup>5+</sup> [Xe]4f <sup>14</sup> 5d <sup>3</sup> 6s <sup>2</sup> tet	<b>74 W</b> Wolfram 183.84(1) 1.9 193/74 3695/6203 s, W, W <sup>6+</sup> [Xe]4f <sup>14</sup> 5d <sup>4</sup> 6s <sup>2</sup> bcc	<b>75 Re</b> Rhenium 186.207(1) 1.9 188/67 3459/5869 s, Re, Re <sup>7+</sup> [Xe]4f <sup>14</sup> 5d <sup>5</sup> 6s <sup>2</sup> hcp	<b>76 Os</b> Osmium 190.23(3) 2.2 185/53 3306/5285 s, Os, Os <sup>8+</sup> [Xe]4f <sup>14</sup> 5d <sup>6</sup> 6s <sup>2</sup> hcp	<b>77 Ir</b> Iridium 192.221(3) 2.4 180/82 2719/4403 s, Ir, Ir <sup>3+</sup> [Xe]4f <sup>14</sup> 5d <sup>7</sup> 6s <sup>2</sup> fcc	<b>78 Pt</b> Platin 195.084(9) 2.28 177/94 2041.4/4098 s, Pt, Pt <sup>2+</sup> [Xe]4f <sup>14</sup> 5d <sup>9</sup> 6s <sup>1</sup> fcc	<b>79 Au</b> Gold 196.966569(5) 2.54 174/99 337.33/2432 s, Au, Au <sup>3+</sup> [Xe]4f <sup>14</sup> 5d <sup>10</sup> 6s <sup>1</sup> fcc	<b>80 Hg</b> Quecksilber 200.592(3) 1.2 171/116 234.3210/629.88 l, Hg, Hg <sup>2+</sup> [Xe]4f <sup>14</sup> 5d <sup>10</sup> 6s <sup>2</sup> rho	<b>81 Tl</b> Thallium 204.38 1.3 156/102.5 557/1746 s, Tl, Tl <sup>3+</sup> [Xe]4f <sup>14</sup> 5d <sup>10</sup> 6s <sup>2</sup> 4p <sup>1</sup> hcp	<b>82 Pb</b> Blei 207.2(1) 1.87 154/133 604.61/2022 s, Pb, Pb <sup>2+</sup> [Xe]4f <sup>14</sup> 5d <sup>10</sup> 6s <sup>2</sup> 4p <sup>2</sup> fcc	<b>83 Bi</b> Bismut 208.98040(1) 2.02 143/90 544.7/1837 s, Bi, Bi <sup>3+</sup> [Xe]4f <sup>14</sup> 5d <sup>10</sup> 6s <sup>2</sup> 4p <sup>3</sup> rho	<b>84 Po</b> Polonium (209) 2.0 135/108 527/1235 n.a., n.a., n.a. [Xe]4f <sup>14</sup> 5d <sup>10</sup> 6s <sup>2</sup> 4p <sup>4</sup> cub	<b>85 At</b> Astat (210) 2.2 127/n.a. 575/610 n.a., n.a., n.a. [Xe]4f <sup>14</sup> 5d <sup>10</sup> 6s <sup>2</sup> 4p <sup>5</sup> cub	<b>86 Rn</b> Radon (222) 2.2 120/202 220/211.5 n.a., n.a., n.a. [Xe]4f <sup>14</sup> 5d <sup>10</sup> 6s <sup>2</sup> 4p <sup>6</sup> fcc
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<b>87 Fr</b> Francium (223) 0.7 n.a./n.a. n.a./n.a. n.a., n.a., n.a. [Rn]7s <sup>1</sup> bcc	<b>88 Ra</b> Radium (226) 0.90 n.a./162 973/2010 s, Ra, Ra <sup>2+</sup> [Rn]7s <sup>2</sup> bcc	<b>89-103</b> Actinoide	<b>104 Rf</b> Rutherfordium (267) n.a. n.a./n.a. 2400/5800 n.a., n.a. [Rn]5f <sup>14</sup> 6d <sup>2</sup> 7s <sup>2</sup> hcp	<b>105 Db</b> Dubnium (268) n.a. n.a./n.a. n.a./n.a. [Rn]5f <sup>14</sup> 6d <sup>3</sup> 7s <sup>2</sup> bcc	<b>106 Sg</b> Seaborgium (269) n.a. n.a./n.a. n.a./n.a. [Rn]5f <sup>14</sup> 6d <sup>4</sup> 7s <sup>2</sup> bcc	<b>107 Bh</b> Bohrium (270) n.a. n.a./n.a. n.a./n.a. [Rn]5f <sup>14</sup> 6d <sup>5</sup> 7s <sup>2</sup> hcp	<b>108 Hs</b> Hassium (269) n.a. n.a./n.a. n.a./n.a. [Rn]5f <sup>14</sup> 6d <sup>6</sup> 7s <sup>2</sup> hcp	<b>109 Mt</b> Meitnerium (278) n.a. n.a./n.a. n.a./n.a. [Rn]5f <sup>14</sup> 6d <sup>7</sup> 7s <sup>2</sup> fcc	<b>110 Ds</b> Darmstadtium (281) n.a. n.a./n.a. n.a./n.a. [Rn]5f <sup>14</sup> 6d <sup>8</sup> 7s <sup>2</sup> bcc	<b>111 Rg</b> Roentgenium (282) n.a. n.a./n.a. 1814/3109 n.a., n.a., n.a. [Rn]5f <sup>14</sup> 6d <sup>9</sup> 7s <sup>2</sup> bcc	<b>112 Cn</b> Copernicium (285) n.a. n.a./n.a. n.a./n.a. [Rn]5f <sup>14</sup> 6d <sup>10</sup> 7s <sup>2</sup> fcc	<b>113 Nh</b> Nihonium (286) n.a. n.a./n.a. 700/1430 n.a., n.a., n.a. [Rn]5f <sup>14</sup> 6d <sup>10</sup> 7s <sup>2</sup> 4p <sup>1</sup> hcp	<b>114 Fl</b> Flerovium (289) n.a. n.a./n.a. 340/420 n.a., n.a., n.a. [Rn]5f <sup>14</sup> 6d <sup>10</sup> 7s <sup>2</sup> 4p <sup>2</sup> fcc	<b>115 Mc</b> Moscovium (289) n.a. n.a./n.a. 670/1400 n.a., n.a., n.a. [Rn]5f <sup>14</sup> 6d <sup>10</sup> 7s <sup>2</sup> 4p <sup>3</sup> rho	<b>116 Lv</b> Livermorium (293) n.a. n.a./n.a. n.a./n.a. n.a., n.a., n.a. [Rn]5f <sup>14</sup> 6d <sup>10</sup> 7s <sup>2</sup> 4p <sup>4</sup> cub	<b>117 Ts</b> Tennessin (294) n.a. n.a./n.a. n.a./n.a. n.a., n.a., n.a. [Rn]5f <sup>14</sup> 6d <sup>10</sup> 7s <sup>2</sup> 4p <sup>5</sup> cub	<b>118 Og</b> Oganesson (294) n.a. n.a./n.a. n.a./n.a. n.a., n.a., n.a. [Rn]5f <sup>14</sup> 6d <sup>10</sup> 7s <sup>2</sup> 4p <sup>6</sup> fcc
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**57 La** **58 Ce** **59 Pr** **60 Nd** **61 Pm** **62 Sm** **63 Eu** **64 Gd** **65 Tb** **66 Dy** **67 Ho** **68 Er** **69 Tm** **70 Yb** **71 Lu**

<b>89 Ac</b> Actinium (227) 1.1 n.a./126 n.a./n.a. n.a., n.a., n.a. [Rn]6d <sup>1</sup> 7s <sup>2</sup> fcc	<b>90 Th</b> Thorium 232.0377(4) 1.3 n.a./108 2023/5061 s, Th, Th <sup>4+</sup> [Rn]6d <sup>2</sup> 7s <sup>2</sup> fcc	<b>91 Pa</b> Protactinium 231.03588(2) 1.5 n.a./104 1841/4300 s, Pa, Pa <sup>5+</sup> [Rn]5f <sup>2</sup> 6d <sup>1</sup> 7s <sup>2</sup> tet	<b>92 U</b> Uran 238.02891(3) 1.38 n.a./103 1405.3/4404 s, U, U <sup>4+</sup> [Rn]5f <sup>3</sup> 6d <sup>1</sup> 7s <sup>2</sup> ort	<b>93 Np</b> Neptunium (237) 1.36 n.a./89 912/444 s, Np, Np <sup>3+</sup> [Rn]5f <sup>4</sup> 6d <sup>1</sup> 7s <sup>2</sup> ort	<b>94 Pu</b> Plutonium (244) 1.28 n.a./100 912.5/3505 s, Pu, Pu <sup>3+</sup> [Rn]5f <sup>6</sup> 7s <sup>2</sup> mon	<b>95 Am</b> Americium (243) 1.13 n.a./111.5 1449/- s, Am, Am <sup>3+</sup> [Rn]5f <sup>7</sup> 7s <sup>2</sup> dhcp	<b>96 Cm</b> Curium (247) 1.28 n.a./99 1613/3383 s, Cm, Cm <sup>3+</sup> [Rn]5f <sup>8</sup> 6d <sup>1</sup> 7s <sup>2</sup> dhcp	<b>97 Bk</b> Berkelium (247) 1.3 n.a./110 1259/2900 s, Bk, Bk <sup>3+</sup> [Rn]5f <sup>9</sup> 7s <sup>2</sup> dhcp	<b>98 Cf</b> Californium (251) 1.3 n.a./109 1173/1339 s, Cf, Cf <sup>3+</sup> [Rn]5f <sup>10</sup> 7s <sup>2</sup> dhcp	<b>99 Es</b> Einsteinium (252) 1.3 n.a./92.8 1173/1339 s, Es, Es <sup>2+</sup> [Rn]5f <sup>11</sup> 7s <sup>2</sup> fcc	<b>100 Fm</b> Fermium (257) 1.3 n.a./n.a. 1800/n.a. n.a., n.a., n.a. [Rn]5f <sup>12</sup> 7s <sup>2</sup> fcc	<b>101 Md</b> Mendelevium (258) 1.3 n.a./n.a. 1100/n.a. n.a., n.a., n.a. [Rn]5f <sup>13</sup> 7s <sup>2</sup> fcc	<b>102 No</b> Nobelium (259) 1.3 n.a./n.a. 1100/n.a. n.a., n.a., n.a. [Rn]5f <sup>14</sup> 7s <sup>2</sup> fcc	<b>103 Lr</b> Lawrencium (266) 1.3 n.a./n.a. 1900/n.a. n.a., n.a., n.a. [Rn]5f <sup>14</sup> 7s <sup>2</sup> 7p <sup>1</sup> fcc
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**Literatur:**  
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[r<sub>i</sub>] R. D. Shannon, *Acta Cryst.*, **1976**, *A32*, 751-767 and [https://en.wikipedia.org/wiki/ionic\\_radius](https://en.wikipedia.org/wiki/ionic_radius).  
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<b>5 B</b> Bor 10.81 2.04 87/41 2349/4200 s, B, B <sup>3+</sup> 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>1</sup>	<b>6 C</b> Kohlenstoff 12.011 2.55 67/30 3915 (subl.) s, C, C <sup>4+</sup> 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>2</sup>	<b>7 N</b> Stickstoff 14.007 3.35 56/132/27 63.15/77.355 g, N <sub>2</sub> , N <sup>3+</sup> 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>3</sup>	<b>8 O</b> Sauerstoff 15.999 3.44 48/126 54.36/90.188 g, O <sub>2</sub> , O <sup>2-</sup> 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>4</sup>	<b>9 F</b> Fluor 18.998403163 3.98 42/119 53.48/85.03 g, F <sub>2</sub> , F <sup>-</sup> 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>5</sup>	<b>10 Ne</b> Neon 20.1797(6) - 38/- 24.56/27.104 g, Ne 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup>
<b>13 Al</b> Aluminium 26.9815385(7) 1.61 118/67.5 933.47/2743 s, Al, Al <sup>3+</sup> [Ne]3s <sup>2</sup> 3p <sup>1</sup>	<b>14 Si</b> Silicium 28.085 1.90 111/54 1687/3538 s, Si, Si <sup>4+</sup> [Ne]3s <sup>2</sup> 3p <sup>2</sup>	<b>15 P</b> Phosphor 30.973761998 2.5 98/52 317/553 (white) s, P, P <sup>5+</sup> [Ne]3s <sup>2</sup> 3p <sup>3</sup>	<b>16</b>		