# Periodensystem der chemischen Elemente

*periodic table of the chemical elements*
*tableau périodique des éléments chimiques*
*tabla periódica de los elementos químicos*
*tavola periodica degli elementi chimici*

Περιοδικού πίνακα των στοιχείων
Периодическая таблица элементов
化學元素週期表
الجدول الدوري للعناصر الكيميائية

Periode

**Hauptgruppen** I (1) … VIII (18)

**Nebengruppen**

1 K
2 L
3 M
4 N
5 O
6 P
7 Q

| | I (1) | II (2) | III (3) | IV (4) | V (5) | VI (6) | VII (7) | VIII (8) | IX (9) | X (10) | XI (11) | XII (12) | III (13) | IV (14) | V (15) | VI (16) | VII (17) | VIII (18) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 $^{1}H$ $^{2}D$ $^{3}T$ 1,008*u*<br>**H**<br>**Wasserstoff**<br>2,20 $H_2$ (g)<br>14,0*K* 21,2*K*<br>-I 0 +I<br>$1s^1$ | | | | | | | | | | | | | | | | | 2 $^{4}He$ 4,003*u*<br>**He**<br>Helium<br>He (g)<br>1,0*K* 4,2*K*<br>0<br>$1s^2$ ≡ [He] |
| 2 | 3 $^{7}Li$ 6,940*u*<br>**Li**<br>Lithium<br>0,98 Li (s)<br>453,7*K* 1603,0*K*<br>0 +I<br>[He]$2s^1$ | 4 $^{9}Be$ 9,012*u*<br>**Be**<br>Beryllium<br>1,57 Be (s)<br>1560,0*K* 3243,0*K*<br>0 +II<br>[He]$2s^2$ | | | | | | | | | | | 5 $^{11}B$ 10,810*u*<br>**B**<br>Bor<br>2,04 B (s)<br>2349,0*K* 4203,0*K*<br>0 +III<br>[He]$2s^2 2p^1$ | 6 $^{12}C$ 12,011*u*<br>**C**<br>**Kohlenstoff**<br>2,55 C (s)<br>3823,2*K* 5103,2*K*<br>0 +II +IV<br>[He]$2s^2 2p^2$ | 7 $^{14}N$ 14,007*u*<br>**N**<br>**Stickstoff**<br>3,04 $N_2$ (g)<br>63,1*K* 77,2*K*<br>-III -II -I 0 +I +II +III +IV +V<br>[He]$2s^2 2p^3$ | 8 $^{16}O$ 15,999*u*<br>**O**<br>**Sauerstoff**<br>3,44 $O_2$ (g)<br>54,8*K* 90,2*K*<br>-II -I 0 +I +II<br>[He]$2s^2 2p^4$ | 9 $^{19}F$ 18,998*u*<br>**F**<br>Fluor<br>4,00 $F_2$ (g)<br>53,5*K* 85,2*K*<br>-I 0<br>[He]$2s^2 2p^5$ | 10 $^{20}Ne$ 20,180*u*<br>**Ne**<br>Neon<br>Ne (g)<br>24,6*K* 27,2*K*<br>0<br>[He]$2s^2 2p^6$ ≡ [Ne] |
| 3 | 11 $^{23}Na$ 22,990*u*<br>**Na**<br>Natrium<br>0,93 Na (s)<br>370,9*K* 1163,0*K*<br>0 +I<br>[Ne]$3s^1$ | 12 $^{24}Mg$ 24,305*u*<br>**Mg**<br>Magnesium<br>1,31 Mg (s)<br>923,0*K* 1383,0*K*<br>0 +II<br>[Ne]$3s^2$ | | | | | | | | | | | 13 $^{27}Al$ 26,982*u*<br>**Al**<br>Aluminium<br>1,61 Al (s)<br>933,4*K* 2743,0*K*<br>0 +I +II +III<br>[Ne]$3s^2 3p^1$ | 14 $^{28}Si$ 28,085*u*<br>**Si**<br>Silicium<br>1,90 Si (s)<br>1683,0*K* 3533,0*K*<br>-IV 0 (+II) +IV<br>[Ne]$3s^2 3p^2$ | 15 $^{31}P$ 30,974*u*<br>**P**<br>**Phosphor**<br>2,19 P (s)<br>317,3*K* 553,2*K*<br>-III 0 +III +IV +V<br>[Ne]$3s^2 3p^3$ | 16 $^{32}S$ 32,063*u*<br>**S**<br>**Schwefel**<br>2,58 S (s)<br>388,36*K* 718,2*K*<br>-II 0 +II +IV +VI<br>[Ne]$3s^2 3p^4$ | 17 $^{35}Cl$ 18,998*u*<br>**Cl**<br>Chlor<br>3,16 $Cl_2$ (g)<br>171,6*K* 238,5*K*<br>-I 0 +I +III + IV +V +VI +VII<br>[Ne]$3s^2 3p^5$ | 18 $^{40}Ar$ 39,948*u*<br>**Ar**<br>Argon<br>Ar (g)<br>83,8*K* 87,2*K*<br>0<br>[Ne]$3s^2 3p^6$ ≡ [Ar] |
| 4 | 19 $^{39}K$ 39,098*u*<br>**K**<br>Kalium<br>0,82 K (s)<br>336,5*K* 1047,0*K*<br>0 +I<br>[Ar]$4s^1$ | 20 $^{40}Ca$ 40,078*u*<br>**Ca**<br>Calcium<br>1,00 Ca (s)<br>1115,0*K* 1760,0*K*<br>0 (+I) +II<br>[Ar]$4s^2$ | 21 $^{45}Sc$ 44,956*u*<br>**Sc**<br>Scandium<br>1,36 Sc (s)<br>1814,0*K* 3003,0*K*<br>0 +III<br>[Ar]$3d^1 4s^2$ | 22 $^{48}Ti$ 47,867*u*<br>**Ti**<br>Titan<br>1,54 Ti (s)<br>1941,0*K* 3533,0*K*<br>0 +II +III +IV<br>[Ar]$3d^2 4s^2$ | 23 $^{51}V$ 50,942*u*<br>**V**<br>Vanadium<br>1,63 V (s)<br>2183,0*K* 3680,0*K*<br>0 +II +III +IV +V<br>[Ar]$3d^3 4s^2$ | 24 $^{52}Cr$ 51,996*u*<br>**Cr**<br>Chrom<br>1,66 Cr (s)<br>2180,0*K* 2755,0*K*<br>0 +II +III +VI<br>[Ar]$3d^5 4s^1$ | 25 $^{55}Mn$ 54,938*u*<br>**Mn**<br>Mangan<br>1,55 Mn (s)<br>1519,0*K* 2373,0*K*<br>0 +I … +VII<br>[Ar]$3d^5 4s^2$ | 26 $^{56}Fe$ 55,845*u*<br>**Fe**<br>Eisen *Ferrum*<br>1,83 Fe (s)<br>1811,0*K* 3273,0*K*<br>0 +II +III +IV +V +VI<br>[Ar]$3d^6 4s^2$ | 27 $^{59}Co$ 58,933*u*<br>**Co**<br>Cobalt<br>1,88 Co (s)<br>1768,0*K* 3173,0*K*<br>0 +II +III<br>[Ar]$3d^7 4s^2$ | 28 $^{58}Ni$ 58,693*u*<br>**Ni**<br>Nickel<br>1,91 Ni (s)<br>1728,0*K* 3003,0*K*<br>-I 0 +II +III +IV<br>[Ar]$3d^8 4s^2$ | 29 $^{63}Cu$ 63,546*u*<br>**Cu**<br>Kupfer *Cuprum*<br>1,90 Cu (s)<br>1357,8*K* 2868*K*<br>0 +I +II<br>[Ar]$3d^{10} 4s^1$ | 30 $^{64}Zn$ 65,382*u*<br>**Zn**<br>Zink<br>1,65 Zn (s)<br>692,7*K* 1180,0*K*<br>0 +II<br>[Ar]$3d^{10} 4s^2$ | 31 $^{69}Ga$ 69,723*u*<br>**Ga**<br>Gallium<br>1,81 Ga (s)<br>302,9*K* 2673,0*K*<br>0 +III<br>[Ar]$3d^{10} 4s^2 4p^1$ | 32 $^{72}Ge$ 72,631*u*<br>**Ge**<br>Germanium<br>2,01 Ge (s)<br>1211,4*K* 3103,0*K*<br>-IV 0 +II +IV<br>[Ar]$3d^{10} 4s^2 5p^2$ | 33 $^{75}Se$ 74,922*u*<br>**As**<br>Arsen<br>2,18 Ar (s)<br>889,2*K* (sublimiert)<br>-III 0 +III +V<br>[Ar]$3d^{10} 4s^2 4p^3$ | 34 $^{80}Se$ 78,971*u*<br>**Se**<br>Selen<br>2,55 Se (s)<br>494,0*K* 958,2*K*<br>-II 0 +II +IV +VI<br>[Ar]$3d^{10} 4s^2 4p^4$ | 35 $^{79}Br$ 79,904*u*<br>**Br**<br>Brom<br>2,96 $Br_2$ (l)<br>265,8*K* 331,7*K*<br>-I 0 +I +III +V +VII<br>[Ar]$3d^{10} 4s^2 4p^5$ | 36 $^{84}Kr$ 83,798*u*<br>**Kr**<br>Krypton<br>Kr (g)<br>115,8*K* 121,2*K*<br>0<br>[Ar]$3d^{10} 4s^2 4p^6$≡[Kr] |
| 5 | 37 $^{85}Rb$ 85,468*u*<br>**Rb**<br>Rubidium<br>0,82 Rb (s)<br>312,5*K* 961,2*K*<br>0 +I<br>[Kr]$5s^1$ | 38 $^{88}Sr$ 87,621*u*<br>**Sr**<br>Strontium<br>0,95 Sr (s)<br>1050,0*K* 1653,0*K*<br>0 +II<br>[Kr]$5s^2$ | 39 $^{89}Y$ 88,906*u*<br>**Y**<br>Yttrium<br>1,22 Y (s)<br>1799,0*K* 3203,0*K*<br>0 +III<br>[Kr]$4d^1 5s^2$ | 40 $^{90}Zr$ 91,224*u*<br>**Zr**<br>Zirconium<br>1,33 Zr (s)<br>2130,0*K* 4650,0*K*<br>0 +II +IV<br>[Kr]$4d^2 5s^2$ | 41 $^{93}Nb$ 92,906*u*<br>**Nb**<br>Niob<br>1,60 Nb (s)<br>2750,0*K* 5017,0*K*<br>0 +II +V<br>[Kr]$4d^4 5s^1$ | 42 $^{98}Mo$ 95,951*u*<br>**Mo**<br>Molybdän<br>2,16 Mo (s)<br>2896,0*K* 4885,0*K*<br>0 +II +III +IV +V +VI<br>[Kr]$4d^5 5s^1$ | 43 98,906*u*<br>**Tc**<br>Technetium<br>1,90 künstlich<br>2430,0*K* 4538,0*K*<br>-III -I 0 +I … +VII<br>[Kr]$4d^5 5s^2$ | 44 $^{102}Ru$ 101,072*u*<br>**Ru**<br>Ruthenium<br>2,20 Ru (s)<br>2607,0*K* 4423,0*K*<br>0 +II +III +IV +VI +VIII<br>[Kr]$4d^7 5s^1$ | 45 $^{103}Rh$ 102,906*u*<br>**Rh**<br>Rhodium<br>2,28 Rh (s)<br>2237,0*K* 4000,0*K*<br>0 +I +II +III +IV<br>[Kr]$4d^8 5s^1$ | 46 $^{106}Pd$ 106,421*u*<br>**Pd**<br>Palladium<br>2,20 Pd (s)<br>1828,1*K* 3233,0*K*<br>0 +II +IV<br>[Kr]$4d^{10} 5s^0$ | 47 $^{107}Ag$ 107,868*u*<br>**Ag**<br>Silber *Argentum*<br>1,93 Ag (s)<br>1234,9*K* 2483,0*K*<br>0 +I +II +III<br>[Kr]$4d^{10} 5s^1$ | 48 $^{114}Cd$ 112,4*u*<br>**Cd**<br>Cadmium<br>1,69 Cd (s)<br>594,2*K* 1038,0*K*<br>0 +II<br>[Kr]$4d^{10} 5s^2$ | 49 $^{115}In$ 114,818*u*<br>**In**<br>Indium<br>1,78 In (s)<br>429,8*K* 2273,0*K*<br>0 +I +III<br>[Kr]$4d^{10} 5s^2 5p^1$ | 50 $^{120}Sn$ 118,711*u*<br>**Sn**<br>Zinn *Stannum*<br>1,96 Sn (s)<br>505,1*K* 2893,0*K*<br>(-IV) 0 +II +IV<br>[Kr]$4d^{10} 5s^2 5p^2$ | 51 $^{121}Sb$ 121,760*u*<br>**Sb**<br>Antimon *Stibium*<br>2,05 Sb (s)<br>903,8*K* 1908,0*K*<br>-III 0 +III +V<br>[Kr]$4d^{10} 5s^2 5p^3$ | 52 $^{130}Te$ 127,603*u*<br>**Te**<br>Tellur<br>2,10 Te (s)<br>722,7*K* 1263,0*K*<br>-II (-I) 0 (+I) +II +IV +VI<br>[Kr]$4d^{10} 5s^2 5p^4$ | 53 $^{127}I$ 126,905*u*<br>**I**<br>Iod<br>2,66 $I_2$ (s)<br>386,9*K* 457,2*K*<br>-I 0 +I +III +V +VII<br>[Kr]$4d^{10} 5s^2 5p^5$ | 54 $^{132}Xe$ 131,293*u*<br>**Xe**<br>Xenon<br>Xe (g)<br>161,4*K* 165,2*K*<br>0<br>[Kr]$4d^{10} 5s^2 5p^6$≡[Xe] |
| 6 | 55 $^{133}Cs$ 132,91*u*<br>**Cs**<br>Caesium<br>0,79 Cs (s)<br>301,6*K* 963,2*K*<br>0 +I<br>[Xe]$6s^1$ | 56 $^{138}Ba$ 137,327*u*<br>**Ba**<br>Barium<br>0,89 Ba (s)<br>1000,0*K* 1910,0*K*<br>0 +II<br>[Xe]$6s^2$ | 57 $^{139}La$ 138,906*u*<br>**La**<br>Lanthan<br>1,10 La (s)<br>1193,0*K* 3742,0*K*<br>0 +III<br>[Xe]$5d^1 6s^2$ | Lathanoide<br>**Ce…Lu** | 72 $^{180}Hf$ 178,492*u*<br>**Hf**<br>Hafnium<br>1,30 Hf (s)<br>2506,0*K* 4876,0*K*<br>0 +IV<br>[Xe]$4f^{14} 5d^2 6s^2$ | 73 $^{181}Ta$ 180,948*u*<br>**Ta**<br>Tantal<br>1,50 Ta (s)<br>3290,0*K* 5693,0*K*<br>0 +V<br>[Xe]$4f^{14} 5d^3 6s^2$ | 74 $^{184}W$ 183,841*u*<br>**W**<br>Wolfram<br>2,36 W (s)<br>3695,0*K* 6203,0*K*<br>0 +II +III +IV +V +VI<br>[Xe]$4f^{14} 5d^4 6s^2$ | 75 $^{187}Re$ 186,207*u*<br>**Re**<br>Rhenium<br>1,90 Re (s)<br>3459,0*K* 5903,0*K*<br>-III -II -I 0 +I … +VII<br>[Xe]$4f^{14} 5d^5 6s^2$ | 76 $^{192}Os$ 190,233*u*<br>**Os**<br>Osmium<br>2,20 Os (s)<br>3400,0*K* 5273,0*K*<br>-II -I 0 +II +III +IV +VI +VIII<br>[Xe]$4f^{14} 5d^6 6s^2$ | 77 $^{193}Ir$ 192,217*u*<br>**Ir**<br>Iridium<br>2,20 Ir (s)<br>2739,0*K* 4403,0*K*<br>-I 0 +I +II +III +IV +VI<br>[Xe]$4f^{14} 5d^7 6s^2$ | 78 $^{195}Pt$ 195,085*u*<br>**Pt**<br>Platin<br>2,28 Pt (s)<br>2041,4*K* 4100,0*K*<br>0 +II +IV +VI<br>[Xe]$4f^{14} 5d^9 6s^1$ | 79 $^{197}Au$ 196,967*u*<br>**Au**<br>Gold *Aurum*<br>2,54 Au (s)<br>1337,3*K* 3243,0*K*<br>-I 0 +I +II +III +V<br>[Xe]$4f^{14} 5d^{10} 6s^1$ | 80 $^{202}Hg$ 200,6*u*<br>**Hg**<br>Quecksilber<br>2,00 Hg (l)<br>234,3*K* 630,2*K*<br>0 +I +II +III +V<br>[Xe]$4f^{14} 5d^{10} 6s^2$ | 81 $^{205}Tl$ 195,1*u*<br>**Tl**<br>Thallium<br>1,62 Tl (s)<br>577,0*K* 1733,0*K*<br>0 +I +III<br>[Xe]$4f^{14} 5d^{10} 6s^2 6p^1$ | 81 $^{208}Pb$ 207,2*u*<br>**Pb**<br>Blei *Plumbum*<br>2,33 Pb (s)<br>600,6*K* 2017,0*K*<br>0 +II +IV<br>[Xe]$4f^{14} 5d^{10} 6s^2 6p^2$ | 83 $^{209}Bi$ 208,980*u*<br>**Bi**<br>Bismut<br>2,02 Bi (s)<br>544,4*K* 1833,0*K*<br>(-III) 0 +I +III +V<br>[Xe]$4f^{14} 5d^{10} 6s^2 6p^3$ | 84 209,980*u*<br>**Po**<br>Polonium<br>2,00<br>527,0*K* 1235,0*K*<br>(-II) 0 +II +IV +VI<br>[Xe]$4f^{14} 5d^{10} 6s^2 6p^4$ | 85 209,987*u*<br>**At**<br>Astat<br>2,20<br>575,0*K* 643,2*K*<br>-I 0 +I +III +IV +VII<br>[Xe]$4f^{14} 5d^{10} 6s^2 6p^5$ | 86 222,000*u*<br>**Rn**<br>Radon<br>202,0*K* 211,3*K*<br>0<br>[Xe]$4f^{14} 5d^{10} 6s^2 6p^6$ |
| 7 | 87 223,02*u*<br>**Fr**<br>Francium<br>0,70<br>300,0*K* 950,0*K*<br>0 +I<br>[Rn]$7s^1$ | 88 226,025*u*<br>**Ra**<br>Radium<br>0,90<br>973,0*K* 2010,0*K*<br>0 +II<br>[Rn]$7s^2$ | 89 227,028*u*<br>**Ac**<br>Actinium<br>1,10<br>1323,0*K* 3573,0*K*<br>0 +III<br>[Rn]$6d^1 7s^2$ | Actinoide<br>**Th…Lr** | 104 261,109*u*<br>**Rf**<br>Rutherfordium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^2 7s^2$ | 105 262,114*u*<br>**Db**<br>Dubnium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^3 7s^2$ | 106 263,118*u*<br>**Sg**<br>Seaborgium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^4 7s^2$ | 107 262,123*u*<br>**Bh**<br>Bohrium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^5 7s^2$ | 108 277,150*u*<br>**Hs**<br>Hassium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^6 7s^2$ | 109 276,151*u*<br>**Mt**<br>Meitnerium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^7 7s^2$ | 110 281,162*u*<br>**Ds**<br>Darmstadtium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^9 7s^1$ | 111 280,164*u*<br>**Rg**<br>Roentgenium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^{10} 7s^1$ | 112 285,174*u*<br>**Cn**<br>Copernicium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^{10} 7s^2$ | 113 284,178*u*<br>**Uut**<br>Ununtrium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^{10} 7s^2 7p^1$ | 114 289,187*u*<br>**Fl**<br>Flevorium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^{10} 7s^2 7p^2$ | 115 288,192*u*<br>**Uup**<br>Ununpentium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^{10} 7s^2 7p^3$ | 116 293,000*u*<br>**Lv**<br>Livermorium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^{10} 7s^2 7p^4$ | 117 292,000*u*<br>**Uus**<br>Ununseptium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^{10} 7s^2 7p^5$ | 118 294,000*u*<br>**Uuo**<br>Ununoctium<br>künstlich<br>0<br>[Rn]$5f^{14} 6d^{10} 7s^2 7p^6$ |
| | Alkalimetalle | Erdalkalimetalle | Scandiumgruppe | Seltenerdmetalle | Titangruppe | Vanadiumgruppe | Chromgruppe | Mangangruppe | Eisengruppe | Cobaltgruppe | Nickelgruppe | Kupfergruppe | Zinkgruppe | Borgruppe | C-Si-Gruppe | N-P-Gruppe | Chalkogene | Halogene / Edelgase |

**ferromagnetische Elemente**
(bei Raumtemperatur $\vartheta$ = 298,15*K*)

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lanthanoide | 58 $^{140}Ce$ 140,116*u*<br>**Ce**<br>Cer<br>1,12 Ce (s)<br>1068,0*K* 3743,0*K*<br>0 +III +IV<br>[Xe]$4f^1 6s^2$ | 59 $^{141}Pr$ 140,908*u*<br>**Pr**<br>Praseodym<br>1,13 Pr (s)<br>1208,0*K* 3403,0*K*<br>0 +III +IV<br>[Xe]$4f^3 6s^2$ | 60 $^{142}Nd$ 144,242*u*<br>**Nd**<br>Neodym<br>1,14 Nd (s)<br>1297,0*K* 3303,0*K*<br>0 +III +IV<br>[Xe]$4f^4 6s^2$ | 61 146,915*u*<br>**Pm**<br>Promethium<br>1,20<br>1353,0*K* 3273,0*K*<br>0 +III<br>[Xe]$4f^5 6s^2$ | 62 $^{152}Sm$ 150,362*u*<br>**Sm**<br>Samarium<br>1,17 Sm (s)<br>1345,0*K* 2173,0*K*<br>0 +II +III<br>[Xe]$4f^6 6s^2$ | 63 $^{153}Eu$ 151,964*u*<br>**Eu**<br>Europium<br>1,20 Eu (s)<br>1099,0*K* 1713,0*K*<br>0 +II +III<br>[Xe]$4f^7 6s^2$ | 64 $^{158}Gd$ 157,253*u*<br>**Gd**<br>Gadolinium<br>1,20 Gd (s)<br>1585,0*K* 3273,0*K*<br>0 +II +III<br>[Xe]$4f^7 5d^1 6s^2$ | 65 $^{159}Tb$ 158,925*u*<br>**Tb**<br>Terbium<br>1,20 Tb (s)<br>1629,0*K* 3396,0*K*<br>0 +III +IV<br>[Xe]$4f^9 6s^2$ | 66 $^{164}Dy$ 162,500*u*<br>**Dy**<br>Dysprosium<br>1,22 Dy (s)<br>1680,0*K* 2873,0*K*<br>0 +III +IV<br>[Xe]$4f^{10} 6s^2$ | 67 $^{165}Ho$ 164,930*u*<br>**Ho**<br>Holmium<br>1,23 Ho (s)<br>1734,0*K* 2873,0*K*<br>0 +III<br>[Xe]$4f^{11} 6s^2$ | 68 $^{166}Er$ 167,259*u*<br>**Er**<br>Erbium<br>1,24 Er (s)<br>1802,0*K* 3173,0*K*<br>0 +III<br>[Xe]$4f^{12} 6s^2$ | 69 $^{169}Tm$ 168,934*u*<br>**Tm**<br>Thulium<br>1,25 Tm (s)<br>1818,0*K* 2223,0*K*<br>0 +II +III +IV<br>[Xe]$4f^{13} 6s^2$ | 70 $^{174}Yb$ 173,055*u*<br>**Yb**<br>Ytterbium<br>1,10 Yb (s)<br>1097,0*K* 1703,0*K*<br>0 +II +III<br>[Xe]$4f^{14} 6s^2$ | 71 $^{175}Lu$ 174,967*u*<br>**Lu**<br>Lutetium<br>1,27 Lu (s)<br>1925,0*K* 3603,0*K*<br>0 +III<br>[Xe]$4f^{14} 5d^1 6s^2$ |
| Actinoide | 90 232,038*u*<br>**Th**<br>Thorium<br>1,30<br>2028,0*K* 5061,0*K*<br>0 +II +III +IV +V<br>[Rn]$6d^2 7s^2$ | 91 231,036*u*<br>**Pa**<br>Protactinium<br>1,50<br>1841,0*K* 5061,2*K*<br>0 +IV +V<br>[Rn]$5f^2 6d^1 7s^2$ | 92 238,029*u*<br>**U**<br>Uran<br>1,38<br>1406,0*K* 4203,0*K*<br>0 +III +IV +V +VI<br>[Rn]$5f^3 6d^1 7s^2$ | 93 237,048*u*<br>**Np**<br>Neptunium<br>1,36<br>912,0*K* 4175,0*K*<br>0 +III +IV +V +VI +VII<br>[Rn]$5f^4 6d^1 7s^2$ | 94 244,064*u*<br>**Pu**<br>Plutonium<br>1,28<br>912,5*K* 3509,0*K*<br>0 +III +IV +V +VI (+VII)<br>[Rn]$5f^6 7s^2$ | 95 243,061*u*<br>**Am**<br>Americium<br>1,30<br>1449,0*K* 2880,0*K*<br>0 +II +III +IV +V +VI (+VII)<br>[Rn]$5f^7 7s^2$ | 96 247,070*u*<br>**Cm**<br>Curium<br>1,30<br>1613,0*K* 3383,0*K*<br>0 (+II) +III +IV<br>[Rn]$5f^7 6d^1 7s^2$ | 97 247,070*u*<br>**Bk**<br>Berkelium<br>1,30<br>1259,0*K*<br>0 +III +IV<br>[Rn]$5f^9 7s^2$ | 98 251,080*u*<br>**Cf**<br>Californium<br>1,30 künstlich<br>1173,0*K*<br>0 (+II) +III (+IV)<br>[Rn]$5f^{10} 7s^2$ | 99 252,083*u*<br>**Es**<br>Einsteinium<br>künstlich<br>1133,0*K* 1269,0*K*<br>0 +II +III (+IV)<br>[Rn]$5f^{11} 7s^2$ | 100 257,095*u*<br>**Fm**<br>Fermium<br>künstlich<br>1125,0*K*<br>0 +II +III<br>[Rn]$5f^{12} 7s^2$ | 101 258,098*u*<br>**Md**<br>Mendelevium<br>künstlich<br>1100,2*K*<br>0 +II +III<br>[Rn]$5f^{13} 7s^2$ | 102 259,101*u*<br>**No**<br>Nobelium<br>künstlich<br>0 +II +III<br>[Rn]$5f^{14} 7s^2$ | 103 262,110*u*<br>**Lr**<br>Lawrencium<br>künstlich<br>0 +III<br>[Rn]$5f^{14} 6d^1 7s^2$ |

**Metalle**
**Seltenerdmetalle**
**Halbmetalle**
**Nichtmetalle**

**Feststoffe**
**Flüssigkeiten**
**Gase**
**künstliche Elemente**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1, 2 | 26 $^{56}Fe$ 55,845*u* | 3 |
| 4 | **Fe** | |
| 5 | Eisen *Ferrum* | |
| 6 | 1,83 Fe (s) | 7 |
| 8 | 1811,0*K* 3273,0*K* | 9 |
| 10 | 0 +II +III +IV +V +VI | |
| 11 | [Ar]$3d^6 4s^2$ | |

1 Ordnungszahl
2 häufigstes Isotop
3 Atommasse
4 Elementsymbol
5 Name (*lateinischer Name*, Flammenfärbung)
6 Elektronegativität nach PAULING
7 Vorkommen
8 Schmelztemperatur
9 Siedetemperatur
10 Oxidationsstufen
11 Elektronenkonfiguration

**MADELUNG-Energieschema zur Besetzung der Orbitale**

| | | | | | |
|---|---|---|---|---|---|
| 1 | 1s | | | | |
| 2 | 2s | 2p | | | |
| 3 | 3s | 3p | 3d | | |
| 4 | 4s | 4p | 4d | 4f | |
| 5 | 5s | 5p | 5d | 5f | |
| 6 | 6s | 6p | 6d | 6f | |
| 7 | 7s | 7p | 7d | 7f | |
| | $s^2$ | $p^6$ | $d^{10}$ | $f^{14}$ | |

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