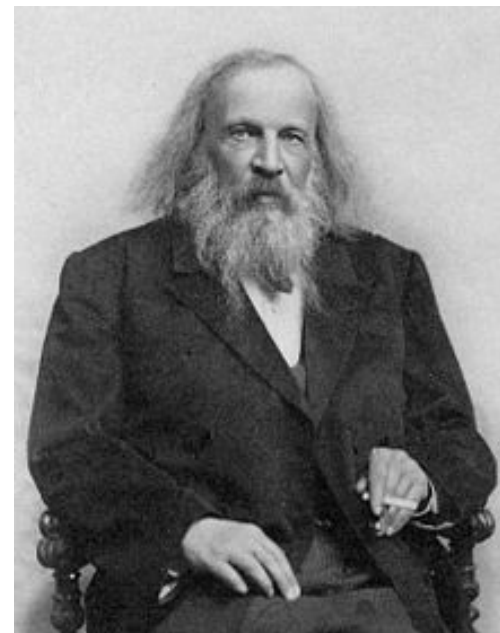


Periodický zákon

D. I. Mendělejev (1869)

„Vlastnosti prvků jsou periodickou funkcí jejich atomových hmotností.“



H. Moseley (1913)

“Vlastnosti prvků jsou periodickou funkcí jejich protonových čísel”.



Mendělejevův periodický systém

1. Opravy nesprávně určených atomových hmotností některých prvků (Ce, Th a U).
2. Změna pořadí některých prvků (Co – Ni, Te – I).
3. Předpovězení nových prvků: *Ekabor* (Sc), *Ekaaluminium* (Ga) a *Ekasilicium* (Ge).

TABLE 5.1 A Comparison of Predicted and Observed Properties for Gallium (*eka-Aluminum*) and Germanium (*eka-Silicon*)

| | | Mendeleev's Prediction | Property Observed |
|--|---------------------|-------------------------------|--------------------------------|
| Gallium (<i>eka-Aluminum</i>) | Atomic weight | 68 | 69.72 |
| | Density | 5.9 g/cm ³ | 5.91 g/cm ³ |
| | Melting point | Low | 29.8°C |
| | Formula of oxide | X ₂ O ₃ | Ga ₂ O ₃ |
| | Formula of chloride | XCl ₃ | GaCl ₃ |
| Germanium (<i>eka-Silicon</i>) | Atomic weight | 72 | 72.61 |
| | Density | 5.5 g/cm ³ | 5.35 g/cm ³ |
| | Color | Dark gray | Light gray |
| | Formula of oxide | XO ₂ | GeO ₂ |
| | Formula of chloride | XCl ₄ | GeCl ₄ |

| Property | Mendeleev's Predictions for Eka-Silicon (made in 1871) | Observed Properties of Germanium (discovered in 1886) |
|---------------------------------------|--|---|
| Atomic weight | 72 | 72.59 |
| Density (g/cm ³) | 5.5 | 5.35 |
| Specific heat (J/g-K) | 0.305 | 0.309 |
| Melting point (°C) | High | 947 |
| Color | Dark gray | Grayish white |
| Formula of oxide | XO ₂ | GeO ₂ |
| Density of oxide (g/cm ³) | 4.7 | 4.70 |
| Formula of chloride | XCl ₄ | GeCl ₄ |
| Boiling point of chloride (°C) | A little under 100 | 84 |

Periodic Table of Elements
based on Mendeleev's Periodic Law

| 0 | I | II | III | IV | V | VI | VII | VIII | | | |
|-------------|-------------|-------------|-------------|------------|-------------|-------------|------------|-------------|------------|------------|--|
| He 4.00 | H 1.01 | Li 6.94 | Be 9.01 | B 10.8 | C 12.0 | N 14.0 | O 16.0 | F 19.0 | | | |
| Ne 20.2 | Na 23.0 | Mg 24.3 | Al 27.0 | Si 28.1 | P 31.0 | S 32.1 | Cl 35.5 | | | | |
| Ar 40.0 | K 39.1 | Ca 40.1 | Sc 45.0 | Ti 47.9 | V 50.9 | Cr 52.0 | Mn 54.9 | Fe 55.9 | Co 58.9 | Ni 58.7 | |
| Kr 83.8 | Rb 85.5 | Sr 87.6 | Y 88.9 | Zr 91.2 | Nb 92.9 | Mo 95.9 | Tc (99) | Ru 101 | Rh 103 | Pd 106 | |
| Xe 131 | Ag 108 | Cd 112 | In 115 | Sn 119 | Sb 122 | Te 128 | I 127 | Os 194 | Ir 192 | Pt 195 | |
| Rn (222) | Ce 133 | Ba 137 | La 139 | Hf 179 | Ta 181 | W 184 | Re 180 | At (210) | | | |
| | Au 197 | Hg 201 | Tl 204 | Pb 207 | Bi 209 | Po (210) | | | | | |
| | Fr (223) | Ra (226) | Ac (227) | Th 232 | Pa (231) | U 238 | | | | | |

● Lanthanide series
● Actinide series
● Known to Ancients

Dobereiner's triads
 Known to Mendeleev

Moseleyho zákon

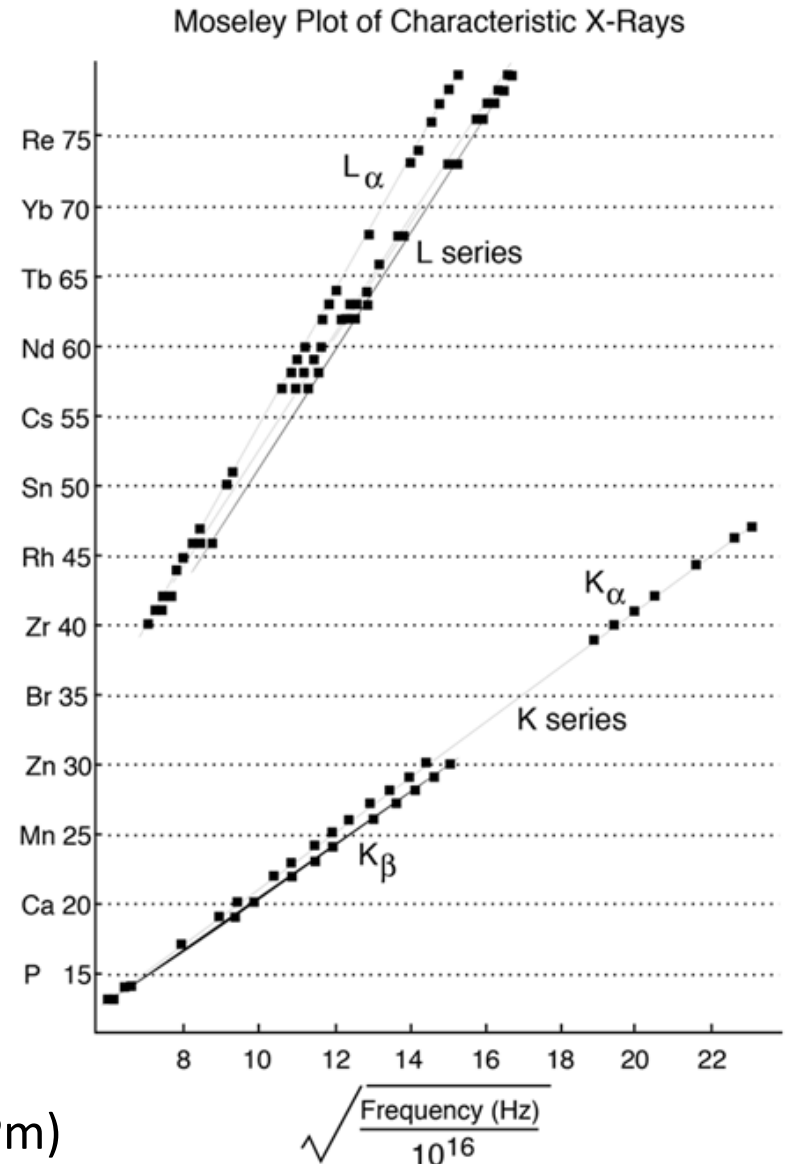
= lineární vztah mezi druhou odmocninou frekvence spektrálních čar charakteristického rentgenového záření a protonovým číslem prvku (Z)

$$\sqrt{\nu} = a(Z - b)$$

1. Správné pořadí prvků Co (Ar = 58.933) a Ni (Ar = 58.71) v periodickém systému.



Podobná situace je ještě v případě Ar (Ar = 39.94) a K (Ar = 39.098) nebo Th (Ar = 232.038) a Pa (Ar = 231.036)

2. Předpovězeny nové prvky: Z = 43 (Tc), 61 (Pm) a 75 (Re)



Atomová hmotnost

Atomic Weight
grams per mole (g/mol)

 View...
  Graph...

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|--------------------|--------------------|--------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|-------------------|-----|----|----|----|----|----|-----|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|--|
| 1 | | | | | | | | | | | | | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.00794 | | | | | | | | | | | | | 139.004 | | | | | | 277 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H 1.0079 1 | | | | | | | | | | | | | | | | | | He 4.0026 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | 13 | | 14 | | 15 | | 16 | | 17 | | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Li 6.941 3 | Be 9.0122 4 | | | | | | | | | | | B 10.811 5 | C 12.011 6 | N 14.007 7 | O 15.999 8 | F 18.998 9 | Ne 20.18 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | 12 | | | | | | | | | | | | 13 | | 14 | | 15 | | 16 | | 17 | | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Na 22.99 | Mg 24.305 | | | | | | | | | | | Al 26.982 | Si 28.085 | P 30.974 | S 32.065 | Cl 35.453 | Ar 39.948 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | | | | | | | | | | | | | | | | |
| K 39.098 19 | Ca 40.078 20 | Sc 44.956 21 | Ti 47.867 22 | V 50.941 23 | Cr 51.996 24 | Mn 54.938 25 | Fe 55.845 26 | Co 58.933 27 | Ni 58.693 28 | Cu 63.546 29 | Zn 65.38 30 | Ga 69.723 31 | Ge 72.64 32 | As 74.922 33 | Se 78.96 34 | Br 79.904 35 | Kr 83.798 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 37 | | 38 | | 39 | | 40 | | 41 | | 42 | | 43 | | 44 | | 45 | | 46 | | 47 | | 48 | | 49 | | 50 | | 51 | | 52 | | 53 | | 54 | |
| Rb 85.468 | Sr 87.62 | Y 88.906 | Zr 91.224 | Nb 92.906 | Mo 95.96 | Tc 98 | Ru 101.07 | Rh 102.91 | Pd 106.42 | Ag 107.87 | Cd 112.41 | In 114.82 | Sn 118.71 | Sb 121.76 | Te 127.60 | I 126.9 | Xe 131.29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 55 | | 56 | | 57 | | 72 | | 73 | | 74 | | 75 | | 76 | | 77 | | 78 | | 79 | | 80 | | 81 | | 82 | | 83 | | 84 | | 85 | | 86 | |
| Cs 132.91 | Ba 137.33 | La 138.91 | Hf 178.49 | Ta 180.95 | W 183.84 | Re 186.21 | Os 190.23 | Ir 192.22 | Pt 195.08 | Au 196.97 | Hg 200.59 | Tl 204.38 | Pb 207.2 | Bi 208.98 | Po 209 | At 210 | Rn 222 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 87 | | 88 | | 89 | | 104 | | 105 | | 106 | | 107 | | 108 | | 109 | | 110 | | 111 | | 112 | | 113 | | 114 | | 115 | | 116 | | 117 | | 118 | |
| Fr 223 | Ra 226 | Ac 227 | Rf 261 | Db 262 | Sg 266 | Bh 264 | Hs 277 | Mt 268 | Ds 271 | Rg 272 | Uub 277 | Uut -- | Uuq -- | Uup -- | Uuh -- | Uus -- | Uuo -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | |
|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Ce 140.12 58 | Pr 140.91 59 | Nd 144.24 60 | Pm 145 61 | Sm 150.36 62 | Eu 151.96 63 | Gd 157.25 64 | Tb 158.93 65 | Dy 162.5 66 | Ho 164.93 67 | Er 167.26 68 | Tm 168.93 69 | Yb 173.05 70 | Lu 174.97 71 |
| Th 232.04 90 | Pa 231.04 91 | U 238.03 92 | Np 237.05 93 | Pu 244 94 | Am 243 95 | Cm 247 96 | Bk 247 97 | Cf 251 98 | Es 252 99 | Fm 257 100 | Md 258 101 | No 259 102 | Lr 262 103 |

Periodická soustava prvků

Periodická soustava (tabulka) prvků = grafické vyjádření periodicity prvků
nejobvyklejší podoba = *dlouhá tabulka*

- rozdělena na 7 period
- prvek na počátku každé periody se vyznačuje tím, že v jeho atomu bylo zahájeno vytváření nové el. sféry
- každá perioda ukončena vzácným plynem

| Group | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|------------|
| Period 1 | 1 H | | | | | | | | | | | | | | | | | 4 He |
| 2 | 7 Li | 9 Be | | | | | | | | | | | 11 B | 12 C | 14 N | 16 O | 19 F | 20 Ne |
| 3 | 23 Na | 24 Mg | | | | | | | | | | | 27 Al | 28 Si | 31 P | 32 S | 35.5 Cl | 40 Ar |
| 4 | 39 K | 40 Ca | 45 Sc | 48 Ti | 51 V | 52 Cr | 55 Mn | 56 Fe | 59 Co | 59 Ni | 63.5 Cu | 65 Zn | 70 Ga | 73 Ge | 75 As | 79 Se | 80 Br | 84 Kr |
| 5 | 85 Rb | 88 Sr | 89 Y | 91 Zr | 93 Nb | 96 Mo | 98 Tc | 101 Ru | 103 Rh | 106 Pd | 108 Ag | 112 Cd | 115 In | 119 Sn | 122 Sb | 128 Te | 127 I | 131 Xe |
| 6 | 133 Cs | 137 Ba | 57-71 | 178 Hf | 181 Ta | 184 W | 186 Re | 190 Os | 192 Ir | 195 Pt | 197 Au | 201 Hg | 204 Tl | 207 Pb | 209 Bi | 209 Po | 210 At | 222 Rn |
| 7 | 223 Fr | 226 Ra | 89-103 | 267 Rf | 268 Db | 271 Sg | 270 Bh | 269 Hs | 278 Mt | 281 Ds | 281 Rg | 285 Cn | 286 Uut | 289 Fl | 289 Uup | 293 Lv | 294 Uus | 294 Uuo |

| | | | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 139 La | 140 Ce | 141 Pr | 144 Nd | 147 Pm | 150 Sm | 152 Eu | 157 Gd | 159 Tb | 162 Dy | 165 Ho | 167 Er | 169 Tm | 173 Yb | 175 Lu |
| 227 Ac | 232 Th | 231 Pa | 238 U | 237 Np | 244 Pu | 243 Am | 247 Cm | 247 Bk | 251 Cf | 252 Es | 257 Fm | 258 Md | 259 No | 262 Lr |

Periodic Table Key

X
Synthetic
Elements

X
Liquids or
melt at close

X
Solids

X
Gases

Alkali Metals

Alkali Earth
Metals

Transition
Metals

Other Metals

Metalloids

Other Non
Metals

Halogens

Noble Gases

Lanthanides
& Actinides

Periodic Table of the Elements

| | | | | | | | | | | | | | | | | | | |
|---|--|---|--|---|---|--|--|---|---|--|--|---|--|---|---|---|--|------------------------------------|
| 1 1IA 1A | | | | | | | | | | | | | 13 IIIA 3A | 14 IVA 4A | 15 VA 5A | 16 VIA 6A | 17 VIIA 7A | 18 VIIIA 8A |
| 1 H Hydrogen 1.0079 | 2 He Helium 4.00260 | | | | | | | | | | | | | | | | | |
| 3 Li Lithium 6.941 | 4 Be Beryllium 9.01218 | | | | | | | | | | | | 5 B Boron 10.811 | 6 C Carbon 12.011 | 7 N Nitrogen 14.00674 | 8 O Oxygen 15.9994 | 9 F Fluorine 18.998403 | 10 Ne Neon 20.1797 |
| 11 Na Sodium 22.989768 | 12 Mg Magnesium 24.305 | 3 IIIB 3B | 4 IVB 4B | 5 VB 5B | 6 VIB 6B | 7 VIIB 7B | 8 VIII 8 | 9 VIII 8 | 10 VIII 8 | 11 IB 1B | 12 IIB 2B | 13 Al Aluminum 26.981539 | 14 Si Silicon 28.0855 | 15 P Phosphorus 30.973762 | 16 S Sulfur 32.066 | 17 Cl Chlorine 35.4527 | 18 Ar Argon 39.948 | |
| 19 K Potassium 39.0983 | 20 Ca Calcium 40.078 | 21 Sc Scandium 44.95591 | 22 Ti Titanium 47.88 | 23 V Vanadium 50.9415 | 24 Cr Chromium 51.9961 | 25 Mn Manganese 54.938 | 26 Fe Iron 55.847 | 27 Co Cobalt 58.9332 | 28 Ni Nickel 58.6934 | 29 Cu Copper 63.546 | 30 Zn Zinc 65.39 | 31 Ga Gallium 69.732 | 32 Ge Germanium 72.64 | 33 As Arsenic 74.92159 | 34 Se Selenium 78.96 | 35 Br Bromine 79.904 | 36 Kr Krypton 83.80 | |
| 37 Rb Rubidium 85.4678 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.90585 | 40 Zr Zirconium 91.224 | 41 Nb Niobium 92.90638 | 42 Mo Molybdenum 95.94 | 43 Tc Technetium 98.9072 | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.9055 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.8682 | 48 Cd Cadmium 112.411 | 49 In Indium 114.818 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.760 | 52 Te Tellurium 127.6 | 53 I Iodine 126.90447 | 54 Xe Xenon 131.29 | |
| 55 Cs Cesium 132.90543 | 56 Ba Barium 137.327 | 57-71 | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.9479 | 74 W Tungsten 183.85 | 75 Re Rhenium 186.207 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.9665 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.3833 | 82 Pb Lead 207.2 | 83 Bi Bismuth 208.98037 | 84 Po Polonium [209.9824] | 85 At Astatine 209.9871 | 86 Rn Radon 222.0176 | |
| 87 Fr Francium 223.0187 | 88 Ra Radium 226.0254 | 89-103 | 104 Rf Rutherfordium [261] | 105 Db Dubnium [262] | 106 Sg Seaborgium [266] | 107 Bh Bohrium [264] | 108 Hs Hassium [269] | 109 Mt Meitnerium [268] | 110 Ds Darmstadtium [269] | 111 Rg Roentgenium [272] | 112 Cn Copernicium [277] | 113 Uut Ununtrium unknown | 114 Fl Flerovium [289] | 115 Uup Ununpentium unknown | 116 Lv Livermorium [298] | 117 Uus Ununseptium unknown | 118 Uuo Ununoctium unknown | |

Lanthanide Series

| | | | | | | | | | | | | | | |
|--|--------------------------------------|--|--|---|---------------------------------------|---|---|---|---|---|-------------------------------------|---|--|--|
| 57 La Lanthanum 138.9055 | 58 Ce Cerium 140.115 | 59 Pr Praseodymium 140.90765 | 60 Nd Neodymium 144.24 | 61 Pm Promethium 144.9127 | 62 Sm Samarium 150.36 | 63 Eu Europium 151.9655 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.92534 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93032 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93421 | 70 Yb Ytterbium 173.04 | 71 Lu Lutetium 174.967 |
|--|--------------------------------------|--|--|---|---------------------------------------|---|---|---|---|---|-------------------------------------|---|--|--|

Actinide Series

| | | | | | | | | | | | | | | |
|---|--|--|---------------------------------------|--|--|--|---------------------------------------|--|--|---|---|--|--|---|
| 89 Ac Actinium 227.0278 | 90 Th Thorium 232.0381 | 91 Pa Protactinium 231.03688 | 92 U Uranium 238.0289 | 93 Np Neptunium 237.0482 | 94 Pu Plutonium 244.0642 | 95 Am Americium 243.0614 | 96 Cm Curium 247.0703 | 97 Bk Berkelium 247.0703 | 98 Cf Californium 251.0796 | 99 Es Einsteinium [254] | 100 Fm Fermium 257.0851 | 101 Md Mendelevium 258.1 | 102 No Nobelium 259.1009 | 103 Lr Lawrencium [262] |
|---|--|--|---------------------------------------|--|--|--|---------------------------------------|--|--|---|---|--|--|---|

| | | | | | | | | | |
|--------------|----------------|------------------|-------------|-----------|----------|---------|-----------|------------|----------|
| Alkali Metal | Alkaline Earth | Transition Metal | Basic Metal | Semimetal | Nonmetal | Halogen | Noble Gas | Lanthanide | Actinide |
|--------------|----------------|------------------|-------------|-----------|----------|---------|-----------|------------|----------|

Klasifikace prvků

| | | | | | | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Ia | IIa | IIIb | IVb | Vb | VIb | VIIb | VIII | | | Ib | IIb | IIIa | IVa | Va | VIa | VIIa | 0 |
| H | | | | | | | | | | | | | | | | | He |
| Li | Be | | | | | | | | | | | B | C | N | O | F | Ne |
| Na | Mg | | | | | | | | | | | Al | Si | P | S | Cl | Ar |
| K | Ca | Sc | Ti | V | Cr | Mn | Fe | Co | Ni | Cu | Zn | Ga | Ge | As | Se | Br | Kr |
| Rb | Sr | Y | Zr | Nb | Mo | Tc | Ru | Rh | Pd | Ag | Cd | In | Sn | Sb | Te | I | Xe |
| Cs | Ba | La | Hf | Ta | W | Re | Os | Ir | Pt | Au | Hg | Tl | Pb | Bi | Po | At | Rn |
| Fr | Ra | Ac | Db | Jl | Rf | Bh | Hn | Mt | | | | | | | | | |

lanthanoidy:

| | | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Ce | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|

aktinoidy:

| | | | | | | | | | | | | | |
|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Th | Pa | U | Np | Pu | Am | Cm | Bk | Cf | Es | Fm | Md | No | Lr |
|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|

Značení

Skupiny prvků

| | |
|--------------|---|
| písmo | alkalické kovy (Li, Na, K, Rb, Cs, Fr) |
| písmo | kovy alkalických zemin (Ca, Sr, Ba, Ra) |
| písmo | triely (B, Al, Ga, In, Tl) |
| písmo | tetrelly (C, Si, Ge, Sn, Pb) |

Značení

Skupiny prvků

| | |
|--------------|---------------------------------------|
| písmo | pentely (N, P, As, Sb, Bi) |
| písmo | chalkogeny (O, S, Se, Te, Po) |
| písmo | halogeny (F, Cl, Br, I, At) |
| písmo | vzácné plyny (He, Ne, Ar, Kr, Xe, Rn) |

| | |
|------------------------|------------------------|
| alkalické kovy | Li, Na, K, Rb, Cs, Fr |
| kovy alkalických zemin | Ca, Sr, Ba, Ra |
| chalkogeny | O, S, Se, Te, Po |
| halogeny | F, Cl, Br, I, At |
| vzácné plyny | He, Ne, Ar, Kr, Xe, Rn |
| prvky vzácných zemin | Sc, Y, La, Ce až Lu |
| lanthanoidy | Ce až Lu |
| aktinoidy | Th až Lr |
| transurany | Np až Lr |
| triáda železa | Fe, Co, Ni |
| lehké kovy | Ru, Rh, Pd |
| platínové | |
| těžké kovy | Os, Ir, Pt |
| platínové | |

| | | | | | | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Ia | IIa | IIIb | IVb | Vb | VIb | VIIb | VIII | | | Ib | IIb | IIIa | IVa | Va | VIa | VIIa | 0 |
| H | | | | | | | | | | | | | | | | | He |
| Li | Be | | | | | | | | | | | B | C | N | O | F | Ne |
| Na | Mg | | | | | | | | | | | Al | Si | P | S | Cl | Ar |
| K | Ca | Sc | Ti | V | Cr | Mn | Fe | Co | Ni | Cu | Zn | Ga | Ge | As | Se | Br | Kr |
| Rb | Sr | Y | Zr | Nb | Mo | Tc | Ru | Rh | Pd | Ag | Cd | In | Sn | Sb | Te | I | Xe |
| Cs | Ba | La | Hf | Ta | W | Re | Os | Ir | Pt | Au | Hg | Tl | Pb | Bi | Po | At | Rn |
| Fr | Ra | Ac | Db | Jl | Rf | Bh | Hn | Mt | | | | | | | | | |

lanthanoidy:

| | | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Ce | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|

aktinoidy:

| | | | | | | | | | | | | | |
|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Th | Pa | U | Np | Pu | Am | Cm | Bk | Cf | Es | Fm | Md | No | Lr |
|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|

Značení

Skupiny prvků

| | |
|--------------|--|
| | transurany (prvky následující za uranem) |
| písmo | lanthanoidy (Ce až Lu) |
| písmo | aktinoidy (Th až Lr) |
| | prvky vzácných zemin (Sc, Y, La, Ce až Lu) |

Značení

Skupiny prvků

| | |
|--|-----------------------------------|
| | triáda železa (Fe, Co, Ni) |
| | lehké platínové kovy (Ru, Rh, Pd) |
| | těžké platínové kovy (Os, Ir, Pt) |

Periodická soustava prvků (krátká forma)

| Period | Series | Group | | | | | | | | | | | | | | | | | | | | | |
|--------|--------|-----------|---|-----------|---|------------|---|-----------|-----|------------|---|-----------|---|------------|---|------------|---|-----------|---|-----------|-----|---|---|
| | | a | I | b | a | II | b | a | III | b | a | IV | b | a | V | b | a | VI | b | a | VII | b | a |
| 1 | I | 1 H | | | | | | | | | | | | | | | | 2 He | | | | | |
| 2 | II | 3 Li | | 4 Be | | 5 B | | 6 C | | 7 N | | 8 O | | 9 F | | 10 Ne | | | | | | | |
| 3 | III | 11 Na | | 12 Mg | | 13 Al | | 14 Si | | 15 P | | 16 S | | 17 Cl | | 18 Ar | | | | | | | |
| 4 | IV | 19 K | | 20 Ca | | 21 Sc | | 22 Ti | | 23 V | | 24 Cr | | 25 Mn | | 26 Fe | | 27 Co | | 28 Ni | | | |
| | V | 29 Cu | | 30 Zn | | 31 Ga | | 32 Ge | | 33 As | | 34 Se | | 35 Br | | 36 Kr | | | | | | | |
| 5 | VI | 37 Rb | | 38 Sr | | 39 Y | | 40 Zr | | 41 Nb | | 42 Mo | | 43 Tc | | 44 Ru | | 45 Rh | | 46 Pd | | | |
| | VII | 47 Ag | | 48 Cd | | 49 In | | 50 Sn | | 51 Sb | | 52 Te | | 53 I | | 54 Xe | | | | | | | |
| 6 | VIII | 55 Cs | | 56 Ba | | 57-71 | | 72 Hf | | 73 Ta | | 74 W | | 75 Re | | 76 Os | | 77 Ir | | 78 Pt | | | |
| | IX | 79 Au | | 80 Hg | | 81 Tl | | 82 Pb | | 83 Bi | | 84 Po | | 85 At | | 86 Rn | | | | | | | |
| 7 | X | 87 Fr | | 88 Ra | | 89-103 | | 104 Rf | | 105 Db | | 106 Sg | | 107 Bh | | 108 Hs | | 109 Mt | | 110 Ds | | | |
| | XI | 111 Rg | | 112 Cn | | 113 Uut | | 114 Fl | | 115 Uup | | 116 Lv | | 117 Uus | | 118 Uuo | | | | | | | |

| | | | | | | | | |
|-----------------------------|------------------|----|------------------------------------|-----------------|-------------------------------|-----------------|-------------------------------|-----------------|
| Higher oxides | R ₂ O | RO | R ₂ O ₃ | RO ₂ | R ₂ O ₅ | RO ₃ | R ₂ O ₇ | RO ₄ |
| Volatile hydrogen compounds | | | [(RH ₃) _x] | RH ₄ | RH ₃ | RH ₂ | RH | |

| | | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|
| 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 |
| 89 Ac | 90 Th | 91 Pa | 92 U | 93 Np | 94 Pu | 95 Am | 96 Cm | 97 Bk | 98 Cf | 99 Es | 100 Fm | 101 Md | 102 No | 103 Lr |

Periodická soustava prvků (krátká forma)

| Group 0 | I | | II | | III | | IV | | V | | VI | | VII | | VIII | |
|---------|-------|---|-------|---|--------|---|-------|---|-------|---|-------|---|-------|---|---------------------|--|
| | a | b | a | b | a | b | a | b | a | b | a | b | a | b | | |
| | H 1 | | | | | | | | | | | | | | | |
| He 2 | Li 3 | | Be 4 | | B 5 | | C 6 | | N 7 | | O 8 | | F 9 | | | |
| Ne 10 | Na 11 | | Mg 12 | | Al 13 | | Si 14 | | P 15 | | S 16 | | Cl 17 | | | |
| Ar 18 | K 19 | | Ca 20 | | Sc 21 | | Ti 22 | | V 23 | | Cr 24 | | Mn 25 | | Fe 26, Co 27, Ni 28 | |
| | Cu 29 | | Zn 30 | | Ga 31 | | Ge 32 | | As 33 | | Se 34 | | Br 35 | | | |
| Kr 36 | Rb 37 | | Sr 38 | | Y 39 | | Zr 40 | | Nb 41 | | Mo 42 | | - | | Ru 44, Rh 45, Pd 46 | |
| | Ag 47 | | Cd 48 | | In 49 | | Sn 50 | | Sb 51 | | Te 52 | | I 53 | | | |
| Xe 54 | Cs 55 | | Ba 56 | | 57-71* | | Hf 72 | | Ta 73 | | W 74 | | Re 75 | | Os 76, Ir 77, Pt 78 | |
| | Au 79 | | Hg 80 | | Tl 81 | | Pb 82 | | Bi 83 | | Po 84 | | - | | | |
| Rn 86 | - | | Ra 88 | | Ac 89 | | Th 90 | | Pa 91 | | U 92 | | | | | |

* Lanthanum and the lanthanons

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