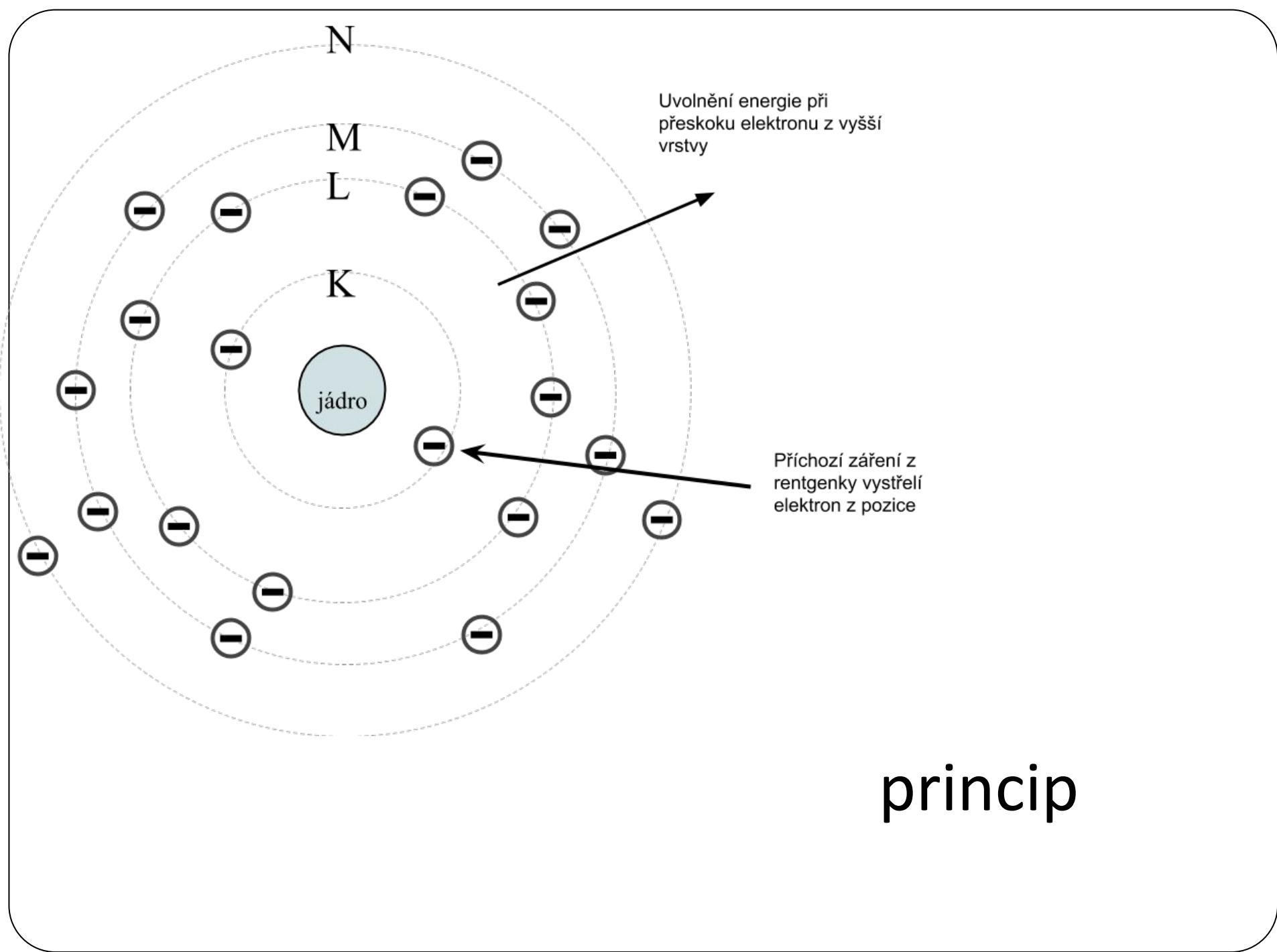


Rentgenfluorescenční analýza (XRF)

Klára Tomášková, Šimon Charvát
konzultant: Radek Prokeš

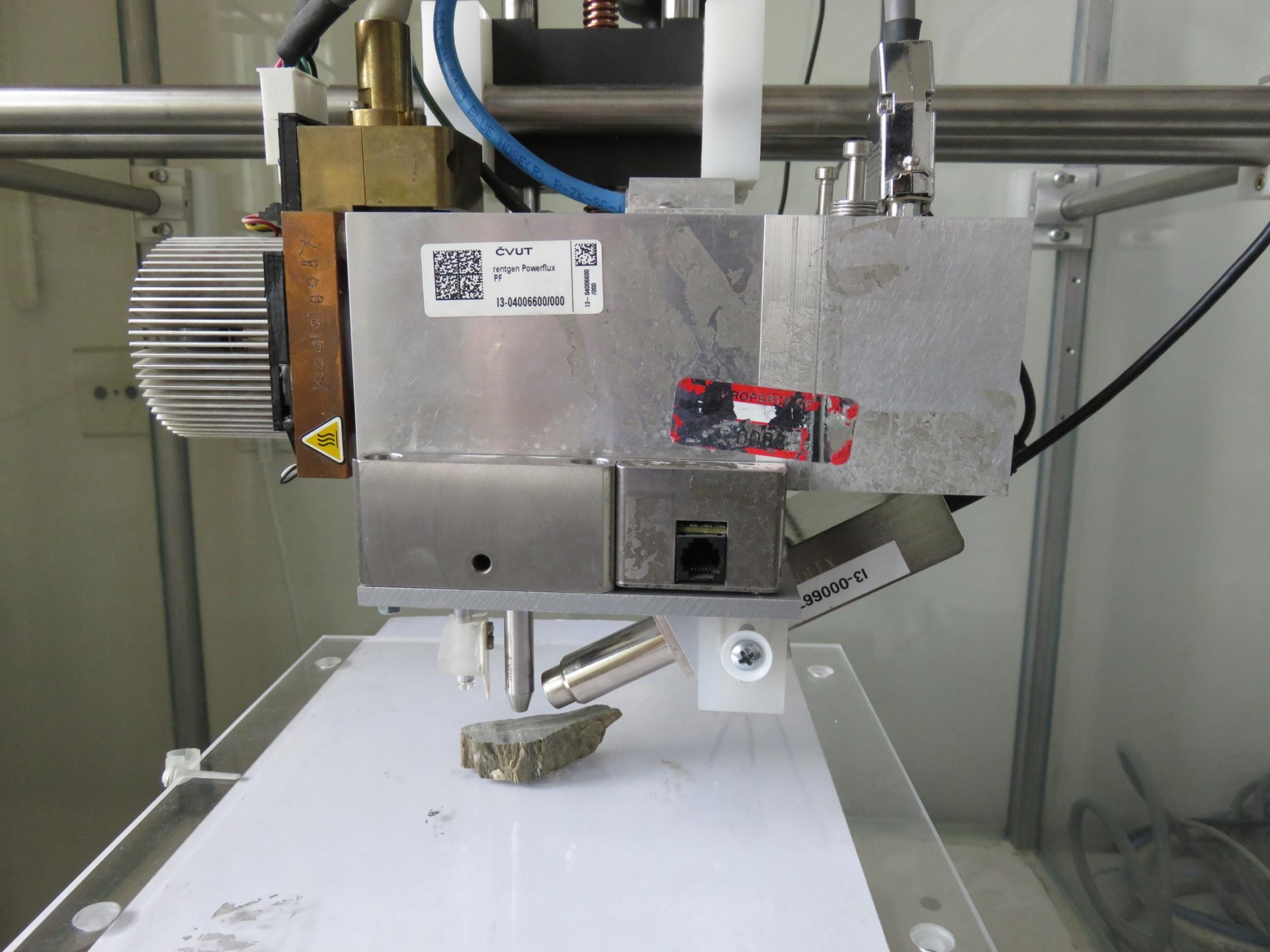
Co to je XRF?

- rozbor materiálu a koncentrace
- nedestruktivní metoda
- využití: průmysl, umělecká díla



Jak funguje přístroj?

- Rentgenka - katoda - anoda - optika
- Detektor – křemík (SDD)



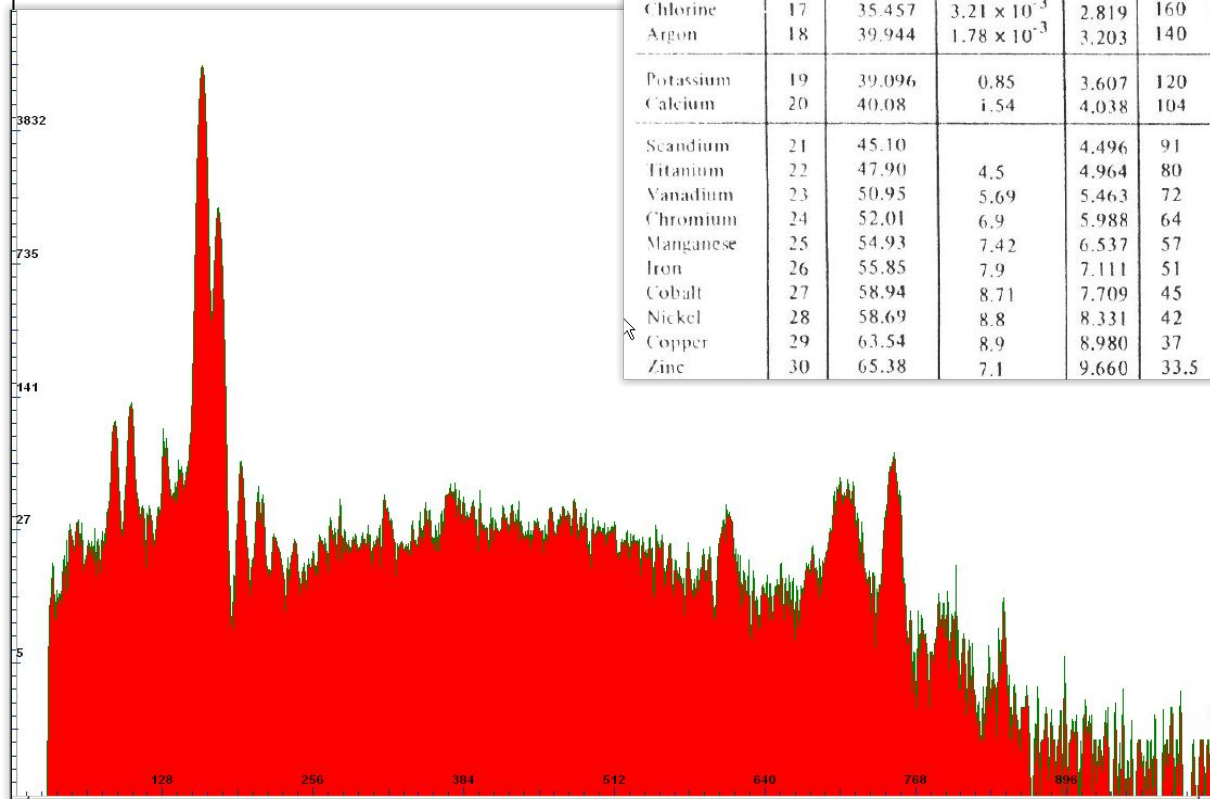
CVUT
rentgen Powerflux
PF
13-04006600/000

PROPERTY OF
00000

13-00066

Kalibrace

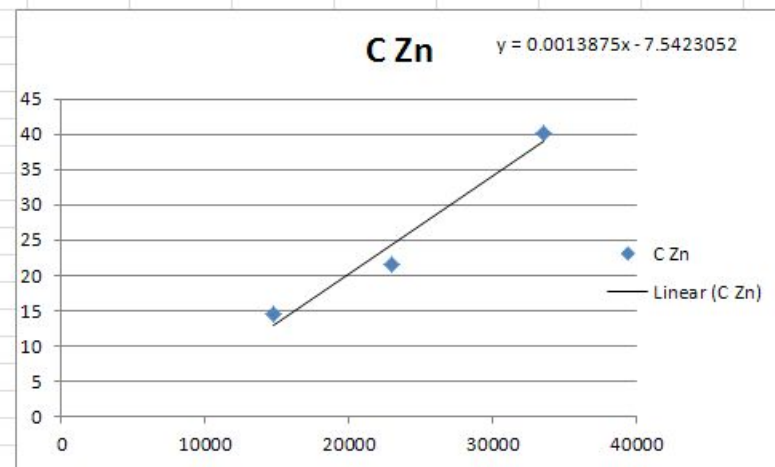
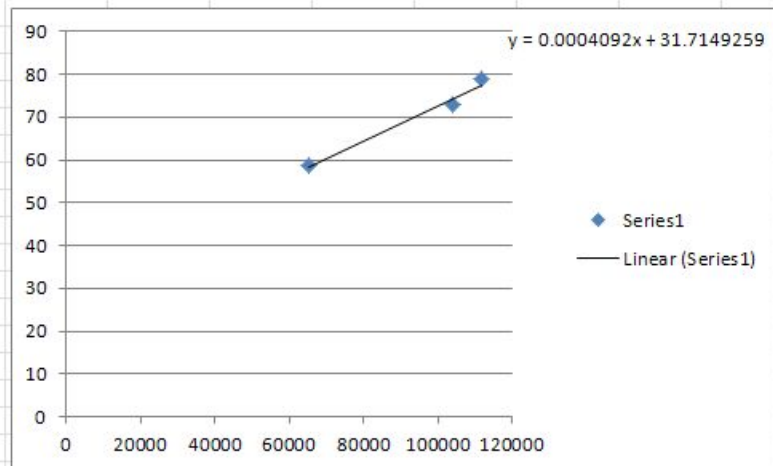
Element	Atomic Number	Atomic Weight, A	Density at N.T.P., g/cm ³	Energy E_K keV	Mass Absorption Coefficients, cm ² /g		K_{α_1}	K_{β_1}	L_I	L_{II}	L_{III}	L_{α_1}	L_{β_1}	L_{γ_1}
					μ_1	μ_2								
Hydrogen	1	1.008	0.0898×10^{-3}	0.0136										
Helium	2	4.003	0.178×10^{-3}	0.0246										
Lithium	3	6.940	0.53	0.055			0.052							
Beryllium	4	9.02	1.84	0.116			0.110							
Boron	5	10.82	2.34	0.192			0.185							
Carbon	6	12.010	2.25	0.283	1000		0.282							
Nitrogen	7	14.008	1.25×10^{-3}	0.399	840		0.392							
Oxygen	8	16.000	1.43×10^{-3}	0.531	720	11000	0.523							
Fluorine	9	19.000	1.70×10^{-3}	0.687	600	8600	0.677							
Neon	10	20.183	0.90×10^{-3}	0.874	500	6800	0.851		0.048	0.022	0.022			
Sodium	11	22.997	0.97	1.08	420	5400	1.041	1.067	0.055	0.034	0.034			
Magnesium	12	24.32	1.74	1.303	350	4500	1.254	1.297	0.063	0.050	0.049			
Aluminium	13	26.97	2.70	1.559	300	3700	1.487	1.553	0.087	0.073	0.072			
Silicon	14	28.06	2.35	1.838	250	3000	1.740	1.832	0.118	0.099	0.098			
Phosphorus	15	30.98	2.2	2.142	215	2500	2.015	2.136	0.153	0.129	0.128			
Sulphur	16	32.066	2.0	2.470	185	2100	2.308	2.464	0.193	0.164	0.163			
Chlorine	17	35.457	3.21×10^{-3}	2.819	160	1800	2.622	2.815	0.238	0.203	0.202			
Argon	18	39.944	1.78×10^{-3}	3.203	140	1500	2.957	3.192	0.287	0.247	0.245			
Potassium	19	39.096	0.85	3.607	120	1250	3.313	3.589	0.341	0.297	0.294			
Calcium	20	40.08	1.54	4.038	104	1050	3.691	4.012	0.399	0.352	0.349	0.341	0.344	
Scandium	21	45.10		4.496	91	900	4.090	4.460	0.462	0.411	0.406	0.395	0.399	
Titanium	22	47.90	4.5	4.964	80	760	4.510	4.931	0.530	0.460	0.454	0.452	0.458	
Vanadium	23	50.95	5.69	5.463	72	660	4.952	5.427	0.604	0.519	0.512	0.510	0.519	
Chromium	24	52.01	6.9	5.988	64	580	5.414	5.946	0.679	0.583	0.574	0.571	0.581	
Manganese	25	54.93	7.42	6.537	57	500	5.898	6.490	0.762	0.650	0.639	0.636	0.647	
Iron	26	55.85	7.9	7.111	51	450	6.403	7.057	0.849	0.721	0.708	0.704	0.717	
Cobalt	27	58.94	8.71	7.709	45	390	6.930	7.649	0.929	0.794	0.779	0.775	0.790	
Nickel	28	58.69	8.8	8.331	42	345	7.477	8.264	1.015	0.871	0.853	0.849	0.866	
Copper	29	63.54	8.9	8.980	37	310	8.047	8.904	1.100	0.953	0.933	0.928	0.948	
Zinc	30	65.38	7.1	9.660	33.5	275	8.638	9.571	1.200	1.045	1.022	1.009	1.032	





Měření koncentrace mědi a zinku

	Cu	C Cu	Zn	C Zn
300b	65305	58.7	33512	40.2
302b	104202	72.75	22976	21.5
303b	111781	78.8	14739	14.5
301b	94406	70.34586	33092	38.37284



Plusy a mínusy

+

- nedestruktivní
- rozbor většiny prvků najednou
- rychlost

-

- nezahrnuje lehké prvky
- překrývání K a L linek
- ionizující záření – potřeba licence



Diskuzní okénko,
čas na dotazy