

付録 2 波 長 表

(a) K 系列波長表 (単位 Å)

• 印は Siegbahn の値 (kX 単位) に、他は Cauchois-Hulubeis の値 (kX 単位) にそれぞれ 1.00202 を乗じたものである。

原子 番号	元 素	励起 電圧 (kV)	α_2	α_1	β_3	β_1	β_5	β_2	吸 収 端 波 長
			L _{II} →K strong	L _{III} →K very strong	M _{II} →K very weak	M _{III} →K medium	N _{II} →K very weak	N _{III} →K weak	
4	Be*	0.093	113.43	—	—	—	—	—	—
5	B*	0.166	67.64	—	—	—	—	—	—
6	C*	0.252	44.59	—	—	—	—	—	43.58
7	N*	0.372	31.634	—	—	—	—	—	31.186
8	O*	0.507	23.658	—	—	—	—	—	23.55
9	F*	0.664	18.370	—	—	—	—	—	—
10	Ne*	0.835	~ 14.830	—	—	—	—	—	—
11	Na*	1.07	11.9090	—	—	11.6174	—	—	—
12	Mg*	1.30	9.88894	—	—	9.55827	—	—	9.5115
13	Al*	1.55	8.33681	—	—	7.98109	—	—	7.9516
14	Si*	1.83	7.12536	—	—	6.76814	—	—	6.7446
15	P*	2.14	6.15441	—	—	5.80380	—	—	5.7866
16	S	2.46	5.37472	5.37196	—	5.0317	—	—	5.0184
17	Cl	2.82	4.73050	4.72760	—	4.4031	—	—	4.3969
18	Ar	3.20	4.19456	4.19162	—	—	—	—	3.8707
19	K	3.59	3.74462	3.74122	—	3.4538	3.44144	—	3.4365
20	Ca	4.00	3.36159	3.35855	—	3.0896	3.07420	—	3.0702
21	Sc	4.49	3.03452	3.03114	—	2.7800	2.76357	—	2.7578
22	Ti	4.95	2.75207	2.74841	—	2.51381	2.4987	—	2.4973
23	V	5.45	2.50729	2.50348	—	2.28434	2.2701	—	2.2690
24	Cr	5.98	2.29351	2.28964	—	2.08480	2.0709	—	2.0701
25	Mn	6.54	2.10568	2.10175	—	1.91015	1.89709	—	1.8964
26	Fe	7.10	1.93991	1.93597	—	1.75653	1.74432	—	1.7433
27	Co	7.71	1.79278	1.78892	—	1.62075	1.60896	—	1.6081
28	Ni	8.29	1.66169	1.65784	—	1.50010	—	1.48861	1.4880
29	Cu	8.86	1.54433	1.54050	—	1.39217	—	1.38102	1.3804
30	Zn	9.65	1.43894	1.43511	—	1.29522	1.2845	1.28366	1.2833
31	Ga	10.4	1.34394	1.34003	—	1.20785	1.1983	1.1962	1.1957
32	Ge	11.1	1.25797	1.25401	—	1.12890	1.1197	1.11684	1.1165
33	As	11.9	1.17981	1.17581	—	1.05726	1.0487	1.04492	1.0450
34	Se	12.7	1.10876	1.10471	—	0.99212	0.9843	0.97989	0.9798
35	Br	13.5	1.04376	1.03969	—	0.93273	0.9255	0.92039	0.9199
36	Kr	14.3	0.9841	0.9801	—	0.87845	—	—	0.8655
37	Rb	15.2	0.92963	0.92551	0.82916	0.82863	0.8221	0.81641	0.8155
38	Sr	16.1	0.87938	0.87521	0.78334	0.78288	0.7769	0.77076	0.7697
39	Y	17.0	0.83300	0.82879	0.74112	0.74068	0.7347	0.72860	0.7276
40	Zr	18.0	0.79010	0.78588	0.70225	0.70169	—	0.68989	0.6888
41	Nb	19.0	0.75040	0.74615	0.66630	0.66572	—	0.65412	0.6529
42	Mo	20.0	0.71354	0.70926	0.632819	0.63225	—	0.620950	0.6198
43	Tc	—	0.676	0.673	—	0.602	—	—	—
44	Ru	22.1	0.64736	0.64304	0.57309	0.57246	—	0.56164	0.5605
45	Rh	23.2	0.61761	0.61325	0.54619	0.54559	—	0.53504	0.5338
46	Pd	24.4	0.58980	0.58542	0.52114	0.52052	—	0.51021	0.5092
47	Ag	25.5	0.56378	0.55936	0.49765	0.49701	—	0.48701	0.4858
48	Cd	26.7	0.53941	0.53498	0.47567	0.47506	—	0.46514	0.4641
49	In	27.9	0.51652	0.51209	0.45515	0.45451	—	0.44498	0.4439
50	Sn	29.1	0.49502	0.49056	0.43583	0.43522	—	0.42585	0.4248
51	Sb	30.4	0.47479	0.47032	—	0.41707	—	—	0.4066
52	Te	31.8	0.45575	0.45126	—	0.40007	—	—	0.3897
53	I	33.2	0.43781	0.43399	0.38470	0.38388	—	0.37547	0.3738

原子 番号	元 素	励 起 電 圧 (kV)	α_2	α_1	β_3	β_1	β_5	β_2	吸 收 端 波 長
			L II → K strong	L III → K very strong	M II → K very weak	M III → K medium	N II → K very weak	N III → K weak	
54	Xe	34.6	0.42034	0.41596	—	0.36846	—	—	0.3585
55	Cs	35.9	0.40481	0.40027	0.35508	0.35435	—	0.34586	0.3447
56	Ba	37.4	0.38965	0.38509	0.34158	0.34079	—	0.33289	0.3314
57	La*	38.7	0.37528	0.37071	0.32875	0.32796	—	0.32031	0.3184
58	Ce*	40.3	0.36167	0.35708	0.31636	0.31579	—	0.30832	0.3065
59	Pr*	41.9	0.34873	0.34412	0.30500	0.30424	—	0.29685	0.29517
60	Nd*	43.6	0.33645	0.33182	0.29410	0.29327	—	0.28631	0.28451
61	Pm*	—	—	—	—	—	—	—	—
62	Sm*	46.8	—	—	0.27380	—	—	0.26629	—
63	Eu*	48.6	—	—	0.26439	—	—	0.25697	—
64	Gd*	50.3	—	—	0.25522	—	—	0.24812	—
65	Tb*	52.0	—	—	0.24679	—	—	0.23960	—
66	Dy*	53.8	—	—	0.23835	—	—	0.23175	—
67	Ho*	55.8	—	—	—	—	—	—	—
68	Er*	57.5	—	—	0.22345	—	—	0.21715	—
69	Tm*	59.5	—	—	0.21602	—	—	—	—
70	Yb*	61.4	—	—	0.20958	—	—	0.20363	—
71	Lu*	63.4	—	—	0.20293	—	—	0.19689	—
72	Hf*	65.4	—	—	0.19623	—	—	0.19080	—
73	Ta	67.4	0.22029	0.215484	—	0.19029	—	0.18489	0.1839
74	W	69.3	0.21811	0.208992	—	0.18459	—	0.17934	0.1784
75	Re	—	—	—	—	—	—	—	—
76	Os	73.8	0.201626	0.196783	—	0.173607	—	0.16909	0.1678
77	Ir	76.0	0.195889	0.191033	—	0.16853	—	0.16409	0.1631
78	Pt	78.0	0.190372	0.185504	—	0.16366	—	0.15919	0.1581
79	Au	80.5	0.185064	0.180185	—	0.15897	—	0.15457	0.1534
80	Hg	82.9	—	—	—	—	—	—	—
81	Tl	85.2	0.175038	0.170131	—	—	—	0.14568	0.1447
82	Pb	87.6	0.170285	0.165364	—	—	—	0.14154	0.1408
83	Bi	90.1	0.165704	0.160777	—	—	—	0.13649	0.1371
90	Th	109	0.137820	0.132806	—	—	—	0.1136	0.1129
92	U	115	0.130962	0.125940	—	—	—	0.10864	0.1068

波 長 表 (つづき)

(b) L 系列波長表 (単位 Å)

Siegbahn の値 (kX 単位) に 1.00202 を乗じたものである。

原子番号	元 素	励起電圧 (kV)	β_4	β_3	r_2	r_3	r_4	η	r_5	β_1
			M _I →L _I medium	M _{III} →L _I medium	N _{II} →L _I weak	N _{III} →L _I weak	O _{III} →L _I very weak	M _I →L _{II} weak	N _I →L _{II} very weak	M _{IV} →L _{II} strong
26	Fe	—	15.6415	15.6415	—	—	—	19.690	—	17.255
27	Co	—	—	—	—	—	—	17.806	—	15.652
28	Ni	—	13.1665	13.1665	—	—	—	16.203	—	14.269
29	Cu	—	12.1244	12.1244	—	—	—	14.860	—	13.056
30	Zn	1.20	11.1825	11.1825	—	—	—	13.637	—	11.984
31	Ga	1.31	—	—	—	—	—	12.585	—	11.032
32	Ge	1.41	—	—	—	—	—	11.610	—	10.174
33	As	1.52	8.9300	8.9300	—	—	—	10.733	—	9.414
34	Se	1.64	—	—	—	—	—	9.959	—	8.736
35	Br	1.77	—	—	—	—	—	9.254	—	8.125
37	Rb	2.05	6.8146	6.7831	6.0482	6.0482	—	—	—	—
38	Sr	2.19	6.4047	6.3710	5.6488	5.6488	—	7.521	6.2923	6.6234
39	Y	2.36	6.0198	5.9862	5.2809	5.2809	—	7.0442	—	6.2164
40	Zr	2.51	5.6631	5.6299	4.9508	4.9508	—	6.6072	5.4929	5.8354
41	Nb	2.68	5.3413	5.3078	4.6561	4.6561	—	6.209	—	5.4914
42	Mo	2.87	5.0512	5.0148	4.3743	4.3783	—	5.849	4.8410	5.1769
44	Ru	3.24	4.5217	4.4854	3.8958	3.8958	—	—	4.2852	4.6203
45	Rh	3.43	4.2888	4.2533	3.6899	3.6889	—	4.9211	4.0434	4.3728
46	Pd	3.64	4.0708	4.0338	3.4879	3.4879	—	4.6596	3.8193	4.1457
47	Ag	3.79	3.8689	3.8322	3.3065	3.3065	—	4.4190	3.6146	3.9345
48	Cd	4.07	3.6818	3.6437	3.1379	3.1379	—	4.1960	3.4250	3.7376
49	In	4.28	3.5061	3.4689	2.9796	2.9796	2.9250	3.9841	3.2483	3.5550
50	Sn	4.49	3.3430	3.3056	2.8358	2.8358	2.7769	3.7894	3.0836	3.3847
51	Sb	4.69	3.1907	3.1515	2.7007	2.7007	2.6389	3.6069	2.9315	3.2249
52	Te	4.93	3.0461	3.0074	2.5701	2.5708	2.5108	—	—	3.0766
53	I	5.18	2.9118	2.8740	2.4470	2.4410	2.3910	—	—	2.9368
55	Cs	5.71	2.6659	2.6282	2.2367	2.2315	2.1735	2.9893	2.4160	2.6332
56	Ba	5.99	2.5550	2.5161	2.1383	2.1338	2.0757	2.8629	2.3070	2.5674
57	La	6.26	2.4487	2.4102	2.0447	2.0407	1.9827	2.740	2.2052	2.4583
58	Ce	6.54	2.3489	2.3106	1.9599	1.9548	1.8990	2.6200	2.1099	2.3557
59	Pr	6.83	2.2546	2.2169	1.8788	1.8737	1.8190	2.512	2.0202	2.2585
60	Nd	7.12	2.1666	2.1265	1.8010	1.7961	1.7443	2.4091	1.9352	2.1666
62	Sm	7.73	2.0004	1.9620	1.6592	1.6550	1.6065	2.218	1.7787	1.9976
63	Eu	8.04	1.9260	1.8865	1.5971	1.5909	1.5438	—	1.708	1.9202
64	Gd	8.37	1.8530	1.8146	1.5341	1.5290	1.4848	—	1.6409	1.8462
65	Tb	8.70	1.7850	1.7460	1.4768	1.4713	1.4268	—	1.5774	1.7763
66	Dy	9.03	1.7202	1.6811	1.4232	1.4168	1.3742	1.8960	1.5183	1.7100
67	Ho	9.38	1.6586	1.6193	1.3705	1.3640	1.3224	1.8257	1.402	1.6468
68	Er	9.73	1.5996	1.5610	1.3211	1.3144	1.2758	1.7583	1.406	1.5866
69	Tm	10.1	1.5443	1.5053	1.2738	1.2679	1.2289	1.6957	1.3550	1.5299
70	Yb	10.5	1.4912	1.4523	1.2281	1.2223	1.1844	1.634	1.306	1.4755
71	Lu	10.9	1.4401	1.4010	1.1856	1.1799	1.1434	1.5770	1.259	1.4236
72	Hf	11.3	1.3921	1.3524	1.1436	1.1379	1.1023	1.5228	1.2145	1.3739
73	Ta	11.7	1.34578	1.30672	1.1052	1.09930	1.0648	1.4709	1.1732	1.32690
74	W	12.1	1.30141	1.26247	1.06803	1.06201	1.0279	1.4210	1.1321	1.28175
75	Re	12.5	1.2588	1.2201	1.0320	1.0257	0.9930	1.3734	1.0934	1.23853
77	Ir	13.4	1.17953	1.14077	0.96527	0.95906	0.9276	1.2843	1.0216	1.15773
78	Pt	13.9	1.14216	1.10388	0.93421	0.92786	0.8970	1.2428	0.9877	1.11984
79	Au	14.4	1.10645	1.06765	0.90430	0.89762	0.8672	1.2027	0.9555	1.08346
80	Hg	14.8	1.0714	1.03254	0.8742	0.8679	0.8378	1.1639	0.9948	1.04863
81	Tl	15.3	1.03908	1.00052	0.84742	0.84104	0.8117	1.1277	0.8947	1.01504
82	Pb	15.8	1.00766	0.96916	0.82082	0.81457	0.7859	1.0922	0.8664	0.98281
83	Bi	16.4	0.97698	0.93855	0.79560	0.79105	0.7608	1.0586	0.8394	0.95194
90	Th	20.5	0.79352	0.75476	0.64208	0.63541	0.6107	0.8545	0.6748	0.76510
91	Pa	—	0.7699	0.7322	0.6239	0.6168	0.5937	0.8295	0.6549	0.7422
92	U	21.7	0.7479	0.71022	0.60508	0.59832	0.5748	0.8051	0.6355	0.71996

τ_1	τ	β_6	α_2	α_1	β_2	吸 收 端 波 長			元
$N_{IV} \rightarrow L_{II}$	$M_I \rightarrow L_{III}$	$N_I \rightarrow L_{III}$	$M_{IV} \rightarrow L_{III}$	$M_V \rightarrow L_{III}$	$N_V \rightarrow L_{III}$	L I	L II	L III	素
medium	medium	weak	medium	very strong	medium				
—	20.161	—	17.616	17.616	—	—	—	—	Fe
—	18.237	—	15.972	15.972	—	—	—	—	Co
—	16.583	—	14.559	14.559	—	—	—	—	Ni
—	15.221	—	13.333	13.333	—	—	—	—	Cu
—	13.978	—	12.255	12.255	—	—	13.010	13.289	Zn
—	—	—	—	—	—	—	11.861	12.130	—
—	12.916	—	11.293	11.293	—	—	—	—	Ga
—	11.946	—	10.436	10.436	—	—	—	—	Ge
—	11.070	—	9.671	9.671	—	8.108	9.124	9.367	As
—	10.293	—	8.990	8.990	—	7.505	8.417	8.645	Se
—	9.583	—	8.375	8.375	—	—	—	—	Br
—	—	6.9822	—	—	—	5.9975	—	6.8551	Rb
—	7.838	6.5212	6.8624	6.8624	—	5.5825	6.1746	6.3749	Sr
—	—	6.0980	6.4487	6.4487	—	5.2321	5.7489	5.9564	Y
5.3847	6.913	5.7042	6.0689	6.0689	5.5855	4.8672	5.3767	5.5722	Zr
5.0350	6.523	5.3579	5.730	5.7235	5.2366	4.5809	—	5.2226	Nb
—	—	—	5.412	5.4059	4.9199	4.2984	4.7215	4.9141	Mo
4.1812	5.4975	4.4865	4.8535	4.8455	4.3707	—	4.1777	4.3692	Ru
3.9437	5.2175	4.2414	4.6049	4.5971	4.1304	3.6259	3.9419	4.1295	Rh
3.7239	4.9496	4.0151	4.3754	4.3673	3.9086	3.4275	3.7227	3.9118	Pd
3.5220	4.7071	3.8063	4.1622	4.1540	3.7013	3.2540	3.5138	3.6983	Ag
—	—	—	—	—	—	—	—	—	—
3.3347	4.4803	3.6146	3.9644	3.9558	3.5135	3.0835	3.3259	3.5034	Cd
3.1617	4.2679	3.4349	3.7800	3.7713	3.3379	2.9253	3.1458	3.3222	In
3.0009	4.0715	3.2688	3.6084	3.5995	3.1743	2.7752	2.9783	3.1557	Sn
2.8508	3.8881	3.1134	3.4478	3.4387	3.0227	2.6370	2.8276	2.9967	Sb
2.7120	3.7176	2.9704	3.2976	3.2886	2.8819	2.5090	2.6847	2.8514	Te
—	—	—	—	—	—	—	—	—	—
2.5827	3.5569	2.8362	3.1573	3.1480	2.7516	2.3887	2.5526	2.7194	I
2.3472	3.2662	2.5927	2.9014	2.8919	2.5115	2.1649	2.3122	2.4724	Cs
2.2411	3.1350	2.4822	2.7846	2.7752	2.4041	2.0662	2.2037	2.3616	Ba
2.1415	3.0060	2.3787	2.6743	2.6651	2.3026	1.9729	2.1031	2.2583	La
2.0484	2.8915	2.2815	2.5703	2.5612	2.2086	1.8894	2.0108	2.1641	Ce
—	—	—	—	—	—	—	—	—	—
1.9608	2.7837	2.1903	2.4726	2.4627	2.1191	1.8108	1.9240	2.0770	Pr
1.8776	2.6757	2.1035	2.3804	2.3701	2.0355	1.7352	1.8428	1.9947	Nd
1.7266	2.482	1.9461	2.2102	2.1994	1.8819	1.5986	1.7025	1.8445	Sm
1.6576	2.3951	1.8743	2.1316	2.1206	1.8119	1.5364	1.6261	1.7753	Eu
1.5918	2.3118	1.8067	2.0567	2.0460	1.7454	1.4770	1.5618	1.7096	Gd
—	—	—	—	—	—	—	—	—	—
1.5297	2.2335	1.7410	1.9863	1.9755	1.6824	1.4210	1.5011	1.6486	Tb
1.4727	2.1584	1.6811	1.9195	1.9084	1.6231	1.3676	1.4443	1.5902	Dy
1.4171	2.0863	1.6221	1.8558	1.8447	1.5669	1.3173	1.3897	1.5353	Ho
1.3651	2.0192	1.5668	1.7950	1.7840	1.5137	1.2681	1.33830	1.48218	Er
1.3154	1.9550	1.5146	1.7374	1.7263	1.4631	1.2221	1.2875	1.4328	Tm
—	—	—	—	—	—	—	—	—	—
1.2674	1.894	1.4657	1.6825	1.6712	1.4157	1.1788	1.24064	1.38543	Yb
1.2228	1.8355	1.4172	1.62965	1.61877	1.3700	1.13851	1.1964	1.3402	Lu
1.1789	1.7810	1.3739	1.58023	1.56923	1.3262	1.0975	1.1538	1.2956	Hf
1.13787	1.7284	1.3311	1.53287	1.52192	1.28440	1.059	1.1124	1.2542	Ta
1.09851	1.6784	1.2896	1.48738	1.47634	1.24454	1.0256	1.0739	1.2154	W
—	—	—	—	—	—	—	—	—	—
1.0608	1.6306	1.2506	1.4439	1.43286	1.2065	0.9873	1.0375	1.1779	Re
0.99076	1.54134	1.17782	1.3625	1.35119	1.13526	0.9242	0.9674	1.1060	Ir
0.95792	1.4994	1.14330	1.32422	1.31208	1.10196	0.8932	0.9540	1.0732	Pt
0.92648	1.4598	1.11087	1.28762	1.27634	1.07017	0.8639	0.9027	1.0403	Au
0.8964	1.42128	1.0790	1.25203	1.24113	1.03980	0.8359	0.8726	1.0095	Hg
—	—	—	—	—	—	—	—	—	—
0.86746	1.3847	1.04960	1.21872	1.20736	1.01026	0.8088	0.8436	0.9798	T
0.83970	1.3501	1.02112	1.18647	1.17495	0.98281	0.7828	0.8159	0.9511	Pl
0.81307	1.3164	0.99331	1.15534	1.14381	0.95517	0.7574	0.7894	0.9240	Bb
0.65308	1.1150	0.82813	0.96780	0.95508	0.79352	0.6051	0.6306	0.7615	Tl
0.6338	1.0907	0.8078	0.9446	0.9328	0.7737	—	—	—	Ph
0.61483	1.0671	0.78838	0.92248	0.91058	0.75459	0.5691	0.5925	0.7223	U

付録3 質量吸収係数 μ/ρ (cm^2/g)

(International Tables X-ray Crystallography ■より)

(注 ゴシック数字は精度の低いものを示す)

Absorber	Target Radiation $\lambda(\text{\AA})$	Ag		Mo		Zn		Cu		Ni		Co	
		$K\bar{\alpha}$ 0.5608	$K\beta_1$ 0.4970	$K\bar{\alpha}$ 0.7107	$K\beta_1$ 0.6323	$K\bar{\alpha}$ 1.4364	$K\beta_1$ 1.2952	$K\bar{\alpha}$ 1.5418	$K\beta_1$ 1.3922	$K\bar{\alpha}$ 1.6591	$K\beta_1$ 1.5001	$K\bar{\alpha}$ 1.7902	$K\beta_1$ 1.6208
1	H	0.371	0.366	0.380	0.376	0.425	0.414	0.435	0.421	0.448	0.431	0.464	0.443
2	He	0.195	0.190	0.207	0.200	0.347	0.306	0.383	0.333	0.430	0.368	0.491	0.414
3	Li	0.187	0.177	0.217	0.200	0.611	0.492	0.716	0.571	0.851	0.673	1.03	0.804
4	Be	0.229	0.208	0.298	0.258	1.25	0.959	1.50	1.15	1.82	1.39	2.25	1.71
5	B	0.279	0.244	0.392	0.327	1.97	1.49	2.39	1.81	2.93	2.21	3.63	2.74
6	C	0.400	0.333	0.625	0.495	3.76	2.81	4.60	3.44	5.68	4.26	7.07	5.31
7	N	0.544	0.433	0.916	0.700	6.13	4.56	7.52	5.60	9.31	6.95	11.6	8.70
8	O	0.740	0.570	1.31	0.981	9.34	6.92	11.5	8.52	14.2	10.6	17.8	13.3
9	F	0.976	0.732	1.80	1.32	13.3	9.86	16.4	12.2	20.3	15.1	25.4	19.0
10	Ne	1.31	0.969	2.47	1.80	18.6	13.8	22.9	17.0	28.4	21.1	35.4	26.5
11	Na	1.67	1.22	3.21	2.32	24.5	18.1	30.1	22.3	37.3	27.8	46.5	34.8
12	Mg	2.12	1.54	4.11	2.96	31.4	23.2	38.6	28.7	47.7	35.6	59.5	44.6
13	Al	2.65	1.90	5.16	3.71	39.6	29.3	48.6	36.2	60.1	44.9	74.8	56.2
14	Si	3.28	2.35	6.44	4.61	49.4	36.6	60.6	45.1	74.9	56.0	93.3	70.1
15	P	4.01	2.85	7.89	5.64	60.5	44.8	74.1	55.2	91.5	68.5	114	85.5
16	S	4.84	3.44	9.55	6.82	72.8	54.1	89.1	66.5	110	82.4	136	103
17	Cl	5.77	4.09	11.4	8.14	86.3	64.3	106	79.0	130	97.6	161	122
18	Ar	6.81	4.82	13.5	9.62	101	75.3	123	92.4	151	114	187	142
19	K	8.00	5.66	15.8	11.3	117	87.6	143	107	175	132	215	164
20	Ca	9.28	6.57	18.3	13.1	133	100	162	122	198	150	243	186
21	Sc	10.7	7.57	21.1	15.1	152	114	184	139	223	170	273	210
22	Ti	12.3	8.70	24.2	17.3	172	130	208	158	252	193	308	237
23	V	14.0	9.91	27.5	19.7	193	146	233	178	282	217	343	266
24	Cr	15.8	11.2	31.1	22.3	216	164	260	199	314	242	381	296
25	Mn	17.7	12.6	34.7	24.9	237	181	285	219	343	265	414	323
26	Fe	19.7	14.0	38.5	27.7	258	198	308	238	370	288	52.8	349
27	Co	21.8	15.5	42.5	30.6	278	214	313	257	49.0	310	61.1	45.8
28	Ni	24.1	17.1	46.6	33.7	297	230	45.7	275	56.5	42.2	70.5	52.8
29	Cu	26.4	18.8	50.9	36.9	43.1	246	52.9	39.3	65.5	48.9	81.6	61.2
30	Zn	28.8	20.6	55.4	40.2	49.1	36.3	60.3	44.8	74.6	55.7	93.0	69.7
31	Ga	31.4	22.4	60.1	43.7	55.3	40.9	67.9	50.5	83.9	62.7	105	78.4
32	Ge	34.1	24.4	64.8	47.3	61.6	45.6	75.6	56.2	93.4	69.8	116	87.3
33	As	36.9	26.5	69.7	51.1	68.0	50.4	83.4	62.1	103	77.0	128	96.2
34	Se	39.8	28.6	74.7	54.9	74.6	55.3	91.4	68.1	113	84.5	140	105
35	Br	42.7	30.8	79.8	58.8	81.3	60.4	99.6	74.4	123	92.1	152	115
36	Kr	45.8	33.1	84.9	62.8	88.2	65.6	108	80.7	133	99.9	165	124
37	Rb	48.9	35.4	90.0	66.9	95.4	71.0	117	87.3	143	108	177	134
38	Sr	52.1	37.8	95.0	70.9	103	76.6	125	94.0	154	116	190	144
39	Y	55.3	40.3	100	75.0	110	82.3	134	101	165	124	203	154
40	Zr	58.5	42.8	15.9	79.0	118	88.2	143	108	176	133	216	165

Fe		Mn		Cr		元素	密度 (g/cm ³)
K $\bar{\alpha}$ 1.9373	K β_1 1.7565	K $\bar{\alpha}$ 2.1031	K β_1 1.9102	K $\bar{\alpha}$ 2.2909	K β_1 2.0848		
0.483	0.459	0.510	0.480	0.545	0.507	H	0.076 (-260 °C)
0.569	0.474	0.674	0.554	0.813	0.661	He	0.166 × 10 ⁻³
1.25	0.978	1.56	1.21	1.96	1.52	Li	0.534
2.80	2.13	3.53	2.69	4.50	3.44	Be	1.85
4.55	3.44	5.76	4.37	7.38	5.61	B	2.34
8.90	6.69	11.3	8.54	14.5	11.0	C	2.25
14.6	11.0	18.6	14.0	23.9	18.2	N	1.03 (-253 °C) 1.1649 × 10 ⁻³ (gas)
22.4	16.8	28.5	21.5	36.6	27.8	O	1.43 (-253 °C) 1.3318 × 10 ⁻³ (gas)
32.1	24.0	40.8	30.8	52.4	39.8	F	1.5 (-273 °C) 1.696 × 10 ⁻³ (gas)
44.6	33.5	56.7	42.8	72.8	55.3	Ne	1.20 (-245 °C) 0.8387 × 10 ⁻³ (gas)
58.6	44.0	74.4	56.2	95.3	72.5	Na	0.97
74.8	56.3	94.8	71.8	121	92.4	Mg	1.74
93.9	70.9	119	90.2	152	116	Al	2.71
117	88.3	148	112	189	144	Si	2.42
142	108	180	137	229	175	P	2.34
170	129	214	164	272	209	S	2.0
200	152	252	193	318	246	Cl	2.2 (-273 °C) 3.214 × 10 ⁻³ (gas)
232	177	291	223	366	284	Ar	1.65 (-233 °C) 1.6626 × 10 ⁻³ (gas)
266	204	332	256	417	325	K	0.87
299	231	371	288	463	363	Ca	1.54
336	260	414	324	513	405	Sc	2.99
377	293	463	364	571	453	Ti	4.60
419	327	513	405	68.4	502	V	6.10
463	363	62.3	447	79.8	60.7	Cr	7.19
57.2	395	72.6	54.9	93.0	70.8	Mn	7.74
66.4	50.0	84.3	63.8	108	82.2	Fe	7.874
76.8	57.8	97.4	73.8	125	95.0	Co	8.90
88.6	66.7	112	85.1	144	109	Ni	8.90
103	77.3	130	98.5	166	127	Cu	8.94
117	88.0	148	112	189	144	Zn	6.92
131	98.9	166	126	212	162	Ga	5.907
146	110	184	140	235	180	Ge	5.32
160	121	203	154	258	198	As	5.73
175	133	221	168	281	216	Se	4.82
190	144	240	183	305	234	Br	4.2 (-273 °C) 3.12 (liquid)
206	156	258	198	327	252	Kr	3.4 (-273 °C) 3.488 × 10 ⁻³ (gas)
221	168	277	213	351	271	Rb	1.532
236	180	296	227	373	289	Sr	2.6
252	193	315	243	396	308	Y	4.478
268	205	334	258	419	326	Zr	6.50

質量吸収係数(つづき)

Target Radiation λ(Å)		Ag		Mo		Zn		Cu		Ni		Co	
		K $\bar{\alpha}$ 0.5608	K β_1 0.4970	K $\bar{\alpha}$ 0.7107	K β_1 0.6323	K $\bar{\alpha}$ 1.4364	K β_1 1.2952	K $\bar{\alpha}$ 1.5418	K β_1 1.3922	K $\bar{\alpha}$ 1.6591	K β_1 1.5001	K $\bar{\alpha}$ 1.7902	K β_1 1.6208
Absorber													
41	Nb	61.7	45.3	17.1	82.9	126	94.3	153	115	187	142	230	175
42	Mo	64.8	47.8	18.4	13.1	134	101	162	123	198	151	243	186
43	Tc	67.9	50.3	19.7	14.1	142	107	172	131	210	160	257	197
44	Ru	10.7	52.8	21.1	15.1	151	114	183	139	223	170	272	209
45	Rh	11.5	55.2	22.6	16.2	161	121	194	148	236	180	288	222
46	Pd	12.3	57.5	24.1	17.3	170	129	206	157	250	191	304	235
47	Ag	13.1	9.29	25.8	18.5	181	137	218	166	264	203	321	248
48	Cd	14.0	9.91	27.5	19.7	191	145	231	176	279	215	338	262
49	In	14.9	10.6	29.3	21.0	202	154	243	186	294	227	356	277
50	Sn	15.9	11.3	31.1	22.3	213	162	256	197	309	239	373	291
51	Sb	16.9	12.0	33.1	23.8	225	172	270	207	324	251	391	306
52	Te	17.9	12.7	35.0	25.2	236	180	282	218	339	263	407	320
53	I	19.0	13.5	37.1	26.7	247	189	294	228	352	275	422	333
54	Xe	20.1	14.3	39.2	28.2	257	198	306	238	366	286	436	346
55	Cs	21.3	15.1	41.3	29.8	268	207	318	248	378	298	450	358
56	Ba	22.5	16.0	43.5	31.4	278	215	330	258	391	309	463	370
57	La	23.7	16.9	45.8	33.2	289	224	341	268	403	320	475	382
58	Ce	25.0	17.8	48.2	34.9	299	233	352	278	414	331	486	394
59	Pr	26.3	18.8	50.7	36.7	309	242	363	288	426	342	497	405
60	Nd	27.7	19.8	53.2	38.6	320	252	374	298	437	353	543	416
61	Pm	29.1	20.8	55.9	40.6	331	261	386	308	448	364	327	428
62	Sm	30.6	21.9	58.6	42.6	341	271	397	319	487	375	344	461
63	Ea	32.2	23.0	61.5	44.8	352	280	425	329	299	386	156	478
64	Gd	33.8	24.2	64.4	47.0	364	290	439	340	313	412	165	295
65	Tb	35.5	25.4	67.5	49.2	385	301	273	352	141	426	173	309
66	Dy	37.2	26.6	70.6	51.6	397	312	286	369	149	267	182	140
67	Ho	39.0	27.9	73.9	54.0	250	322	128	231	156	278	191	146
68	Er	40.8	29.3	77.3	56.6	261	329	134	242	163	125	199	153
69	Tm	42.8	30.7	80.8	59.2	116	210	140	252	170	130	208	160
70	Yb	44.8	32.2	84.5	61.9	121	219	146	111	178	136	217	167
71	Lu	46.8	33.6	88.2	64.7	127	229	153	116	185	142	226	174
72	Hf	48.8	35.1	91.7	67.4	132	238	159	121	193	148	235	181
73	Ta	50.9	36.7	95.4	70.2	137	104	166	126	201	154	244	189
74	W	53.0	38.2	99.1	73.1	143	109	172	132	208	160	253	196
75	Re	55.2	39.8	103	75.9	149	113	179	137	216	167	262	204
76	Os	57.3	41.4	106	78.7	155	118	186	143	225	173	272	212
77	Ir	59.4	42.9	110	81.4	161	122	193	158	233	180	282	219
78	Pt	61.4	44.5	113	83.9	167	127	200	154	241	187	291	228
79	Au	63.1	45.8	115	86.0	173	132	208	160	250	194	302	236
80	Hg	64.7	47.1	117	87.9	180	137	216	166	259	201	312	245
81	Tl	66.2	48.4	119	89.5	187	143	224	172	268	209	323	253
82	Pb	67.7	49.8	120	91.0	194	148	232	179	278	216	334	262
83	Bi	69.1	51.1	120	92.0	201	154	240	185	288	224	346	272

Fe		Mn		Cr		元素	密度 (g/cm ³)
K $\bar{\alpha}$ 1. 9373	K β_1 1. 7565	K $\bar{\alpha}$ 2. 1031	K β_1 1. 9102	K $\bar{\alpha}$ 2. 2909	K β_1 2. 0848		
284	218	353	273	441	345	Nb	8.57
300	231	372	289	463	363	Mo	10.22
316	244	391	305	485	382	Tc	—
334	259	412	322	509	403	Ru	12.4
352	274	433	340	534	424	Rh	12.44
371	289	455	358	559	446	Pd	12.02
391	305	478	377	586	468	Ag	10.5
412	322	502	398	613	492	Cd	8.65
432	339	525	417	638	514	In	7.31
451	356	547	436	662	536	Sn	7.29
472	373	570	457	688	559	Sb	6.69
490	389	589	474	707	578	Te	6.25
506	404	606	490	722	594	I	4.94
521	418	620	505	763	609	Xe	5.495 × 10 ⁻³ (gas)
534	431	632	518	793	621	Cs	1.9
546	444	675	531	461	661	Bd	3.5
557	456	394	542	202	681	La	6.17
601	468	418	582	219	409	Ce	6.66
359	479	188	603	236	183	Pr	6.782
379	519	201	366	252	196	Nd	7.004
172	538	214	385	268	209	Pm	—
182	328	227	176	284	222	Sm	7.536
193	344	240	186	299	234	Eu	5.259
203	157	252	196	314	247	Gd	7.895
214	165	265	206	329	259	Tb	8.272
224	173	277	216	344	271	Dy	8.536
234	181	289	226	359	283	Ho	8.803
245	190	301	236	373	295	Er	9.051
255	198	314	246	387	307	Tm	9.332
265	206	326	256	401	319	Yb	6.977
276	215	338	266	416	331	Lu	9.847
286	223	350	276	430	343	Hf	13.29
297	232	363	287	444	355	Ta	16.6
308	241	375	297	458	368	W	19.3
319	250	388	308	473	380	Re	21.02
330	259	401	319	487	393	Os	22.5
341	269	414	330	502	406	Ir	22.4
353	278	427	341	517	419	Pt	21.45
365	288	441	353	532	432	Au	19.3
377	298	455	364	547	446	Hg	14.2 (-38.8°C)
389	309	469	377	563	460	Tl	11.85
402	319	483	389	579	474	Pb	11.34
415	330	498	402	596	489	Bi	9.8