

## 4. PRODUCTION AND PROPERTIES OF RADIATIONS

Table 4.3.2.3. *Elastic atomic scattering factors of electrons for neutral atoms and s up to  $6.0\text{Å}^{-1}$* 

Element	Z	$a_1$	$a_2$	$a_3$	$a_4$	$a_5$	$b_1$	$b_2$	$b_3$	$b_4$	$b_5$
H	1	0.0088	0.0449	0.1481	0.2356	0.0914	0.1152	1.0867	4.9755	16.5591	43.2743
He	2	0.0084	0.0443	0.1314	0.1671	0.0666	0.0596	0.5360	2.4274	7.7852	20.3126
Li	3	0.0478	0.2048	0.5253	1.5225	0.9853	0.2258	2.1032	12.9349	50.7501	136.6280
Be	4	0.0423	0.1874	0.6019	1.4311	0.7891	0.1445	1.4180	8.1165	27.9705	74.8684
B	5	0.0436	0.1898	0.6788	1.3273	0.5544	0.1207	1.1595	6.2474	21.0460	59.3619
C	6	0.0489	0.2091	0.7537	1.1420	0.3555	0.1140	1.0825	5.4281	17.8811	51.1341
N	7	0.0267	0.1328	0.5301	1.1020	0.4215	0.0541	0.5165	2.8207	10.6297	34.3764
O	8	0.0365	0.1729	0.5805	0.8814	0.3121	0.0652	0.6184	2.9449	9.6298	28.2194
F	9	0.0382	0.1822	0.5972	0.7707	0.2130	0.0613	0.5753	2.6858	8.8214	25.6668
Ne	10	0.0380	0.1785	0.5494	0.6942	0.1918	0.0554	0.5087	2.2639	7.3316	21.6912
Na	11	0.1260	0.6442	0.8893	1.8197	1.2988	0.1684	1.7150	8.8386	50.8265	147.2073
Mg	12	0.1130	0.5575	0.9046	2.1580	1.4735	0.1356	1.3579	6.9255	32.3165	92.1138
Al	13	0.1165	0.5504	1.0179	2.6295	1.5711	0.1295	1.2619	6.8242	28.4577	88.4750
Si	14	0.0567	0.3365	0.8104	2.4960	2.1186	0.0582	0.6155	3.2522	16.7929	57.6767
P	15	0.1005	0.4615	1.0663	2.5854	1.2725	0.0977	0.9084	4.9654	18.5471	54.3648
S	16	0.0915	0.4312	1.0847	2.4671	1.0852	0.0838	0.7788	4.3462	15.5846	44.6365
Cl	17	0.0799	0.3891	1.0037	2.3332	1.0507	0.0694	0.6443	3.5351	12.5058	35.8633
Ar	18	0.1044	0.4551	1.4232	2.1533	0.4459	0.0853	0.7701	4.4684	14.5864	41.2474
K	19	0.2149	0.8703	2.4999	2.3591	3.0318	0.1660	1.6906	8.7447	46.7825	165.6923
Ca	20	0.2355	0.9916	2.3959	3.7252	2.5647	0.1742	1.8329	8.8407	47.4583	134.9613
Sc	21	0.4636	2.0802	2.9003	1.4193	2.4323	0.3682	4.0312	22.6493	71.8200	103.3691
Ti	22	0.2123	0.8960	2.1765	3.0436	2.4439	0.1399	1.4568	6.7534	33.1168	101.8238
V	23	0.2369	1.0774	2.1894	3.0825	1.7190	0.1505	1.6392	7.5691	36.8741	107.8517
Cr	24	0.1970	0.8228	2.0200	2.1717	1.7516	0.1197	1.1985	5.4097	25.2361	94.4290
Mn	25	0.1943	0.8190	1.9296	2.4968	2.0625	0.1135	1.1313	5.0341	24.1798	80.5598
Fe	26	0.1929	0.8239	1.8689	2.3694	1.9060	0.1087	1.0806	4.7637	22.8500	76.7309
Co	27	0.2186	0.9861	1.8540	2.3258	1.4685	0.1182	1.2300	5.4177	25.7602	80.8542
Ni	28	0.2313	1.0657	1.8229	2.2609	1.1883	0.1210	1.2691	5.6870	27.0917	83.0285
Cu	29	0.3501	1.6558	1.9582	0.2134	1.4109	0.1867	1.9917	11.3396	53.2619	63.2520
Zn	30	0.1780	0.8096	1.6744	1.9499	1.4495	0.0876	0.8650	3.8612	18.8726	64.7016
Ga	31	0.2135	0.9768	1.6669	2.5662	1.6790	0.1020	1.0219	4.6275	22.8742	80.1535
Ge	32	0.2135	0.9761	1.6555	2.8938	1.6356	0.0989	0.9845	4.5527	21.5563	70.3903
As	33	0.2059	0.9518	1.6372	3.0490	1.4756	0.0926	0.9182	4.3291	19.2996	58.9329
Se	34	0.1574	0.7614	1.4834	3.0016	1.7978	0.0686	0.6808	3.1163	14.3458	44.0455
Br	35	0.1899	0.8983	1.6358	3.1845	1.1518	0.0810	0.7957	3.9054	15.7701	45.6124
Kr	36	0.1742	0.8447	1.5944	3.1507	1.1338	0.0723	0.7123	3.5192	13.7724	39.1148
Rb	37	0.3781	1.4904	3.5753	3.0031	3.3272	0.1557	1.5347	9.9947	51.4251	185.9828
Sr	38	0.3723	1.4598	3.5124	4.4612	3.3031	0.1480	1.4643	9.2320	49.8807	148.0937
Y	39	0.3234	1.2737	3.2115	4.0563	3.7962	0.1244	1.1948	7.2756	34.1430	111.2079
Zr	40	0.2997	1.1879	3.1075	3.9740	3.5769	0.1121	1.0638	6.3891	28.7081	97.4289
Nb	41	0.1680	0.9370	2.7300	3.8150	3.0053	0.0597	0.6524	4.4317	19.5540	85.5011
Mo	42	0.3069	1.1714	3.2293	3.4254	2.1224	0.1101	1.0222	5.9613	25.1965	93.5831
Tc	43	0.2928	1.1267	3.1675	3.6619	2.5942	0.1020	0.9481	5.4713	23.8153	82.8991
Ru	44	0.2604	1.0442	3.0761	3.2175	1.9448	0.0887	0.8240	4.8278	19.8977	80.4566
Rh	45	0.2713	1.0556	3.1416	3.0451	1.7179	0.0907	0.8324	4.7702	19.7862	80.2540
Pd	46	0.2003	0.8779	2.6135	2.8594	1.0258	0.0659	0.6111	3.5563	12.7638	44.4283
Ag	47	0.2739	1.0503	3.1564	2.7543	1.4328	0.0881	0.8028	4.4451	18.7011	79.2633
Cd	48	0.3072	1.1303	3.2046	2.9329	1.6560	0.0966	0.8856	4.6273	20.6789	73.4723
In	49	0.3564	1.3011	3.2424	3.4839	2.0459	0.1091	1.0452	5.0900	24.6578	88.0513

## 4.3. ELECTRON DIFFRACTION

Table 4.3.2.3. Elastic atomic scattering factors of electrons for neutral atoms and  $s$  up to  $6.0 \text{ \AA}^{-1}$  (cont.)

Element	Z	$a_1$	$a_2$	$a_3$	$a_4$	$a_5$	$b_1$	$b_2$	$b_3$	$b_4$	$b_5$
Sn	50	0.2966	1.1157	3.0973	3.8156	2.5281	0.0896	0.8268	4.2242	20.6900	71.3399
Sb	51	0.2725	1.0651	2.9940	4.0697	2.5682	0.0809	0.7488	3.8710	18.8800	60.6499
Te	52	0.2422	0.9692	2.8114	4.1509	2.8161	0.0708	0.6472	3.3609	16.0752	50.1724
I	53	0.2617	1.0325	2.8097	4.4809	2.3190	0.0749	0.6914	3.4634	16.3603	48.2522
Xe	54	0.2334	0.9496	2.6381	4.4680	2.5020	0.0655	0.6050	3.0389	14.0809	41.0005
Cs	55	0.5713	2.4866	4.9795	4.0198	4.4403	0.1626	1.8213	11.1049	49.0568	202.9987
Ba	56	0.5229	2.2874	4.7243	5.0807	5.6389	0.1434	1.6019	9.4511	42.7685	148.4969
La	57	0.5461	2.3856	5.0653	5.7601	4.0463	0.1479	1.6552	10.0059	47.3245	145.8464
Ce	58	0.2227	1.0760	2.9482	5.8496	7.1834	0.0571	0.5946	3.2022	16.4253	95.7030
Pr	59	0.5237	2.2913	4.6161	4.7233	4.8173	0.1360	1.5068	8.8213	41.9536	141.2424
Nd	60	0.5368	2.3301	4.6058	4.6621	4.4622	0.1378	1.5140	8.8719	43.5967	141.8065
Pm	61	0.5232	2.2627	4.4552	4.4787	4.5073	0.1317	1.4336	8.3087	40.6010	135.9196
Sm	62	0.5162	2.2302	4.3449	4.3598	4.4292	0.1279	1.3811	7.9629	39.1213	132.7846
Eu	63	0.5272	2.2844	4.3361	4.3178	4.0908	0.1285	1.3943	8.1081	40.9631	134.1233
Gd	64	0.9664	3.4052	5.0803	1.4991	4.2528	0.2641	2.6586	16.2213	80.2060	92.5359
Tb	65	0.5110	2.1570	4.0308	3.9936	4.2466	0.1210	1.2704	7.1368	35.0354	123.5062
Dy	66	0.4974	2.1097	3.8906	3.8100	4.3084	0.1157	1.2108	6.7377	32.4150	116.9225
Ho	67	0.4679	1.9693	3.7191	3.9632	4.2432	0.1069	1.0994	5.9769	27.1491	96.3119
Er	68	0.5034	2.1088	3.8232	3.7299	3.8963	0.1141	1.1769	6.6087	33.4332	116.4913
Tm	69	0.4839	2.0262	3.6851	3.5874	4.0037	0.1081	1.1012	6.1114	30.3728	110.5988
Yb	70	0.5221	2.1695	3.7567	3.6685	3.4274	0.1148	1.1860	6.7520	35.6807	118.0692
Lu	71	0.4680	1.9466	3.5428	3.8490	3.6594	0.1015	1.0195	5.6058	27.4899	95.2846
Hf	72	0.4048	1.7370	3.3399	3.9448	3.7293	0.0868	0.8585	4.6378	21.6900	80.2408
Ta	73	0.3835	1.6747	3.2986	4.0462	3.4303	0.0810	0.8020	4.3545	19.9644	73.6337
W	74	0.3661	1.6191	3.2455	4.0856	3.2064	0.0761	0.7543	4.0952	18.2886	68.0967
Re	75	0.3933	1.6973	3.4202	4.1274	2.6158	0.0806	0.7972	4.4237	19.5692	68.7477
Os	76	0.3854	1.6555	3.4129	4.1111	2.4106	0.0787	0.7638	4.2441	18.3700	65.1071
Ir	77	0.3510	1.5620	3.2946	4.0615	2.4382	0.0706	0.6904	3.8266	16.0812	58.7638
Pt	78	0.3083	1.4158	2.9662	3.9349	2.1709	0.0609	0.5993	3.1921	12.5285	49.7675
Au	79	0.3055	1.3945	2.9617	3.8990	2.0026	0.0596	0.5827	3.1035	11.9693	47.9106
Hg	80	0.3593	1.5736	3.5237	3.8109	1.6953	0.0694	0.6758	3.8457	15.6203	56.6614
Tl	81	0.3511	1.5489	3.5676	4.0900	2.5251	0.0672	0.6522	3.7420	15.9791	65.1354
Pb	82	0.3540	1.5453	3.5975	4.3152	2.7743	0.0668	0.6465	3.6968	16.2056	61.4909
Bi	83	0.3530	1.5258	3.5815	4.5532	3.0714	0.0661	0.6324	3.5906	15.9962	57.5760
Po	84	0.3673	1.5772	3.7079	4.8582	2.8440	0.0678	0.6527	3.7396	17.0668	55.9789
At	85	0.3547	1.5206	3.5621	5.0184	3.0075	0.0649	0.6188	3.4696	15.6090	49.4818
Rn	86	0.4586	1.7781	3.9877	5.7273	1.5460	0.0831	0.7840	4.3599	20.0128	62.1535
Fr	87	0.8282	2.9941	5.6597	4.9292	4.2889	0.1515	1.6163	9.7752	42.8480	190.7366
Ra	88	1.4129	4.4269	7.0460	-1.0573	8.6430	0.2921	3.1381	19.6767	102.0436	113.9798
Ac	89	0.7169	2.5710	5.1791	6.3484	5.6474	0.1263	1.2900	7.3686	32.4490	118.0558
Th	90	0.6958	2.4936	5.1269	6.6988	5.0799	0.1211	1.2247	6.9398	30.0991	105.1960
Pa	91	1.2502	4.2284	7.0489	1.1390	5.8222	0.2415	2.6442	16.3313	73.5757	91.9401
U	92	0.6410	2.2643	4.8713	5.9287	5.3935	0.1097	1.0644	5.7907	25.0261	101.3899
Np	93	0.6938	2.4652	5.1227	5.5965	4.8543	0.1171	1.1757	6.4053	27.5217	103.0482
Pu	94	0.6902	2.4509	5.1284	5.0339	4.8575	0.1153	1.1545	6.2291	27.0741	111.3150
Am	95	0.7577	2.7264	5.4184	4.8198	4.1013	0.1257	1.3044	7.1035	32.4649	118.8647
Cm	96	0.7567	2.7565	5.4364	5.1918	3.5643	0.1239	1.2979	7.0798	32.7871	110.1512
Bk	97	0.7492	2.7267	5.3521	5.0369	3.5321	0.1217	1.2651	6.8101	31.6088	106.4853
Cf	98	0.8100	3.0001	5.4635	4.1756	3.5066	0.1310	1.4038	7.6057	34.0186	90.5226