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that the electron scattering factors for kinematical calculations should be multiplied by relativistic factors.

For high-energy electrons, the relativistic variations of the electron mass, the electron wavelength and the interaction constant, σ, become significant. The relations are

$$m = m_0(1-\beta^2)^{-1/2},$$
$$\lambda = h\left[2em_0E\left(1+\frac{eE}{2m_0c^2}\right)\right]^{-1/2} = \lambda_c\frac{(1-\beta^2)^{1/2}}{\beta}, \quad (4.3.1.33)$$

where m_0 is the rest mass, λ_c is the Compton wavelength, h/m_0c, and $\beta = v/c$. Consequently, σ varies with the incident electron energy as

$$\sigma = 2\pi/[\lambda E[1+(1-\beta^2)^{1/2}]] = 2\pi e/hc\beta. \quad (4.3.1.34)$$

For the calculation of intensities in the kinematical approximation, the values of $f^B(s)$ listed in Tables 4.3.1.1 and 4.3.1.2, which were calculated using m_0, must be multiplied by $m/m_0 = (1-\beta^2)^{-1/2}$ for electrons of velocity v. Values of λ, $1/\lambda$, m/m_0, $\beta = v/c$, and σ are listed for various values of the accelerating voltage, E, in Table 4.3.2.1.

4.3.2. Parameterizations of electron atomic scattering factors (By J. M. Cowley, L. M. Peng, G. Ren, S. L. Dudarev, and M. J. Whelan)

For computer applications, numerical approximations to the $f(s)$ of Tables 4.3.1.1 or 4.3.1.2 are usually preferred and various approximations as sums of Gaussians have been proposed. The initial Gaussian fits were given by Doyle & Turner (1968) for the range $s = 0$ to $2\,\text{Å}^{-1}$. However, for some purposes, as in the image-simulation programs for high-resolution electron microscopy, atomic scattering factors are needed for higher s values, up to $6\,\text{Å}^{-1}$, and, as pointed out by Fox, O'Keefe & Tabbernor (1989), extrapolation of the Gaussian fits of Doyle & Turner to values above $2\,\text{Å}^{-1}$ can be highly inaccurate.

An alternative approach to obtaining numerical values for the electron scattering factors is to make use of the polynomial fits to X-ray scattering factors of Fox *et al.* or the more recent tables of X-ray scattering factors produced by Rez, Rez & Grant (1994), who used a multiconfiguration Dirac–Fock code and two parameterizations in terms of four Gaussians, one of higher accuracy over the range of about $2\,\text{Å}^{-1}$ and the other of lower accuracy over the extended range of about $6\,\text{Å}^{-1}$. The electron scattering factors may then be derived from the X-ray scattering factors by use of the Mott formula (4.3.1.14). For small angles of scattering, the determination of electron scattering factors in this way may give problems, since the X-ray scattering factor tends to the atomic number, and both the numerator and denominator of (4.3.1.14) tend to zero. However, the electron scattering factor may be determined for zero scattering angle using equation (4.3.1.29) and Rez, Rez & Grant (1994) listed values of $f_{el}(0)$ for many elements and ions.

Recently, Peng, Ren, Dudarev & Whelan (1996) have developed a new algorithm, based on a combined modified simulated-annealing and least-squares method, to parameterize both the elastic and absorptive scattering factors as sums of five Gaussians of the form

$$f_{el}(s) = \sum_{i=1}^{n} a_i \exp(-b_i s^2), \quad (4.3.2.1)$$

where a_i and b_i are fitting parameters. The values of their fitting parameters for the range of s values from 0 to 2.0 for elastic electron scattering factors for all neutral atoms with atomic numbers up to 98 are given in Table 4.3.2.2 and the values obtained separately for these atoms for the range of s from 0 to $6.0\,\text{Å}^{-1}$ are given in Table 4.3.2.3. For Table 4.3.2.2, the fitting was made to the values of f given in Table 4.3.1.1. For Table 4.3.2.3, the f values in the range of s from 2.0 to $6.0\,\text{Å}^{-1}$ were those obtained by using the Mott formula to convert the X-ray scattering factors derived from the Dirac–Fock calculations of Rez, Rez & Grant (1994). Similar tables for atomic scattering factors of ions can be found in Peng (1998).

As an indication of the accuracy with which the parameterized f values of (4.3.2.1) reproduce the numerical values of the reference f values, Peng *et al.* (1996) computed values of $\varepsilon = 100\,\sigma/f(0)$, where σ is the square root of the mean square deviation, σ^2, between the numerical and fitted scattering factors. The values of ε are typically in the range 0.02 to 0.05, and are consistently smaller (with a few exceptions) than the corresponding values given for the parameterizations of previous workers (Weickenmeier & Kohl, 1991; Bird & King, 1990; Doyle & Turner, 1968).

For the absorptive scattering factors, corresponding to the imaginary parts added to the real elastic scattering factors as a consequence of inelastic scattering processes, Peng *et al.* (1996) have tabulated values for particular elemental crystals and a selection of crystals of compounds having the zinc-blend structure. The main contribution to the absorptive scattering factors arises from the thermal vibrations of the atoms in the crystals so that the numerical values are not characteristic of the individual atom types but depend on the type of bonding of the atoms in the crystal, as indicated by the Debye–Waller factor, and must be calculated separately for each temperature. The authors offer copies of their computer programs, freely available *via* electronic mail, from which the parameterization of the absorptive scattering factors can be derived for other materials and temperatures, given the values of the atomic numbers of the elements, the Debye–Waller factor and the electron accelerating voltage.

4.3.3. Complex scattering factors for the diffraction of electrons by gases (By A. W. Ross, M. Fink, R. Hilderbrandt, J. Wang, and V. H. Smith Jr)

4.3.3.1. *Introduction*

This section includes tables of scattering factors of interest for gas-phase electron diffraction from atoms and molecules in the keV energy region. In addition to the tables and a description of their uses, a discussion of the theoretical uncertainties related to the material in the tables is also provided. The tables give scattering factors for elastic and inelastic scattering from free atoms. The theory of molecular scattering based on these atomic quantities is also discussed.

4.3.3.2. *Complex atomic scattering factors for electrons*

4.3.3.2.1. *Elastic scattering factors for atoms*

It has long been known that the first Born approximation provides an inadequate description at the 4% accuracy level for elastic and total differential cross sections in the 40 keV energy range for atoms heavier than Ne (Schomaker & Glauber, 1952; Glauber & Schomaker, 1953). Results of early experimental work have been confirmed for both atomic and molecular

(*continued on page* 388)

Table 4.3.1.1. *Atomic scattering amplitudes (Å) for electrons for neutral atoms*

Self-consistent field calculations: HF: non-relativistic Hartree–Fock; RHF, *RHF: relativistic Hartree–Fock.

$(\sin\theta)/\lambda$ (Å^{-1})	Element	H	He	Li	Be	B	C	N	O	F	Ne	Na
	Z	1	2	3	4	5	6	7	8	9	10	11
	Method	HF	RHF	RHF	RHF	RHF	RHF	RHF	RHF	RHF	RHF	RHF
0.00		0.529	0.418	3.286	3.052	2.794	2.509	2.211	1.983	1.801	1.652	4.778
0.01			0.418	3.265	3.042	2.788	2.505	2.209	1.982	1.800	1.651	4.749
0.02			0.417	3.200	3.011	2.768	2.492	2.201	1.976	1.796	1.648	4.663
0.03			0.415	3.097	2.961	2.736	2.471	2.187	1.966	1.789	1.642	4.527
0.04		0.51	0.413	2.961	2.892	2.693	2.442	2.168	1.953	1.779	1.635	4.348
0.05		0.51	0.410	2.800	2.807	2.638	2.406	2.144	1.937	1.767	1.626	4.138
0.06		0.50	0.407	2.622	2.710	2.574	2.363	2.116	1.917	1.752	1.615	3.908
0.07		0.49	0.404	2.435	2.601	2.502	2.313	2.083	1.893	1.735	1.602	3.667
0.08		0.48	0.399	2.245	2.484	2.423	2.259	2.047	1.867	1.716	1.587	3.425
0.09		0.47	0.395	2.058	2.362	2.339	2.200	2.007	1.839	1.694	1.570	3.190
0.10		0.45	0.390	1.879	2.237	2.250	2.138	1.963	1.808	1.671	1.552	2.967
0.11		0.44	0.384	1.710	2.111	2.159	2.072	1.918	1.774	1.646	1.533	2.759
0.12		0.425	0.378	1.554	1.987	2.067	2.005	1.870	1.739	1.619	1.512	2.569
0.13		0.411	0.372	1.411	1.865	1.974	1.936	1.821	1.702	1.591	1.490	2.395
0.14		0.396	0.366	1.282	1.748	1.882	1.866	1.770	1.664	1.562	1.467	2.239
0.15		0.382	0.359	1.166	1.635	1.791	1.796	1.718	1.625	1.532	1.443	2.099
0.16		0.366	0.352	1.063	1.528	1.702	1.727	1.666	1.585	1.501	1.418	1.974
0.17		0.353	0.345	0.971	1.427	1.616	1.658	1.614	1.545	1.469	1.393	1.863
0.18		0.338	0.338	0.889	1.332	1.533	1.591	1.561	1.504	1.436	1.367	1.763
0.19		0.324	0.330	0.817	1.243	1.453	1.524	1.510	1.463	1.404	1.340	1.674
0.20		0.311	0.323	0.753	1.161	1.377	1.460	1.458	1.422	1.371	1.313	1.594
0.22		0.285	0.308	0.646	1.013	1.235	1.337	1.358	1.341	1.304	1.259	1.458
0.24		0.261	0.293	0.562	0.887	1.107	1.222	1.262	1.261	1.238	1.204	1.344
0.25		0.249	0.286	0.526	0.832	1.048	1.168	1.216	1.222	1.206	1.176	1.295
0.26		0.238	0.278	0.494	0.781	0.993	1.117	1.171	1.184	1.173	1.149	1.249
0.28		0.218	0.264	0.440	0.690	0.892	1.020	1.085	1.110	1.110	1.095	1.167
0.30		0.199	0.250	0.396	0.614	0.803	0.932	1.006	1.040	1.049	1.043	1.095
0.32		0.182	0.236	0.359	0.549	0.725	0.853	0.932	0.974	0.991	0.991	1.031
0.34		0.167	0.224	0.328	0.494	0.657	0.781	0.863	0.911	0.935	0.942	0.973
0.35		0.160	0.217	0.314	0.469	0.625	0.748	0.831	0.881	0.908	0.918	0.946
0.36		0.153	0.211	0.301	0.446	0.596	0.717	0.800	0.853	0.882	0.894	0.921
0.38		0.141	0.200	0.279	0.406	0.543	0.658	0.742	0.798	0.831	0.849	0.872
0.40		0.130	0.189	0.259	0.371	0.497	0.606	0.689	0.747	0.784	0.805	0.827
0.42		0.120	0.178	0.241	0.341	0.455	0.559	0.641	0.700	0.739	0.764	0.785
0.44		0.111	0.169	0.226	0.314	0.419	0.517	0.596	0.656	0.697	0.725	0.746
0.45		0.107	0.164	0.219	0.302	0.402	0.497	0.575	0.635	0.677	0.706	0.727
0.46		0.103	0.159	0.212	0.291	0.387	0.479	0.555	0.615	0.658	0.687	0.709
0.48		0.096	0.151	0.200	0.271	0.358	0.444	0.518	0.577	0.621	0.652	0.675
0.50		0.089	0.143	0.188	0.253	0.333	0.413	0.484	0.542	0.586	0.619	0.642
0.55		0.075	0.125	0.164	0.215	0.280	0.348	0.411	0.466	0.510	0.544	0.569
0.60		0.064	0.110	0.145	0.186	0.239	0.297	0.353	0.403	0.445	0.479	0.505
0.65		0.055	0.097	0.128	0.164	0.207	0.256	0.305	0.350	0.390	0.424	0.450
0.70		0.048	0.086	0.115	0.145	0.182	0.223	0.266	0.307	0.344	0.376	0.403
0.80		0.037	0.068	0.093	0.117	0.144	0.175	0.208	0.241	0.272	0.300	0.325
0.90		0.029	0.055	0.077	0.096	0.118	0.141	0.167	0.193	0.219	0.244	0.266
1.00		0.024	0.046	0.064	0.081	0.098	0.117	0.137	0.159	0.180	0.201	0.221
1.10		0.020	0.038	0.054	0.069	0.083	0.099	0.115	0.133	0.150	0.168	0.185
1.20		0.017	0.032	0.046	0.059	0.072	0.085	0.098	0.113	0.128	0.143	0.158
1.30		0.014	0.028	0.040	0.051	0.062	0.073	0.085	0.097	0.110	0.123	0.135
1.40		0.012	0.024	0.035	0.045	0.055	0.064	0.074	0.085	0.095	0.106	0.117
1.50		0.011	0.021	0.031	0.040	0.048	0.057	0.065	0.074	0.084	0.093	0.103
1.60			0.019	0.028	0.035	0.043	0.051	0.058	0.066	0.074	0.083	0.092
1.70			0.016	0.024	0.031	0.038	0.045	0.052	0.059	0.066	0.074	0.081
1.80			0.015	0.022	0.028	0.035	0.041	0.047	0.053	0.060	0.066	0.073
1.90			0.013	0.019	0.026	0.031	0.037	0.043	0.048	0.054	0.060	0.065
2.00			0.012	0.017	0.023	0.028	0.034	0.039	0.044	0.049	0.054	0.059

Table 4.3.1.1. *Atomic scattering amplitudes (Å) for electrons for neutral atoms (cont.)*

$(\sin\theta)/\lambda$ ($Å^{-1}$)	Element	Mg	Al	Si	P	S	Cl	Ar	K	Ca	Sc	Ti
	Z	12	13	14	15	16	17	18	19	20	21	22
	Method	RHF	RHF	RHF	RHF	RHF	RHF	RHF	RHF	RHF	RHF	RHF
0.00		5.207	5.889	5.828	5.488	5.161	4.857	4.580	8.984	9.913	9.307	8.776
0.01		5.187	5.867	5.810	5.476	5.152	4.851	4.576	8.921	9.860	9.264	8.740
0.02		5.124	5.800	5.759	5.439	5.124	4.830	4.559	8.731	9.699	9.134	8.631
0.03		5.022	5.692	5.675	5.378	5.079	4.795	4.531	8.434	9.442	8.926	8.455
0.04		4.884	5.547	5.561	5.296	5.016	4.746	4.493	8.054	9.104	8.649	8.220
0.05		4.717	5.371	5.421	5.192	4.938	4.685	4.444	7.619	8.703	8.318	7.937
0.06		4.527	5.170	5.258	5.071	4.845	4.613	4.386	7.157	8.258	7.946	7.618
0.07		4.320	4.949	5.077	4.935	4.740	4.529	4.320	6.691	7.789	7.548	7.274
0.08		4.102	4.717	4.882	4.785	4.623	4.436	4.245	6.239	7.312	7.139	6.917
0.09		3.879	4.478	4.677	4.625	4.496	4.335	4.163	5.815	6.841	6.729	6.556
0.10		3.656	4.237	4.467	4.457	4.362	4.227	4.074	5.426	6.388	6.328	6.199
0.11		3.437	3.999	4.255	4.285	4.222	4.113	3.980	5.073	5.959	5.944	5.853
0.12		3.226	3.767	4.043	4.109	4.078	3.994	3.881	4.756	5.560	5.580	5.522
0.13		3.025	3.544	3.835	3.933	3.931	3.871	3.779	4.474	5.192	5.239	5.209
0.14		2.835	3.330	3.632	3.758	3.783	3.746	3.674	4.222	4.855	4.924	4.916
0.15		2.657	3.128	3.437	3.586	3.635	3.620	3.566	3.997	4.550	4.633	4.643
0.16		2.492	2.938	3.249	3.417	3.487	3.493	3.458	3.795	4.273	4.366	4.390
0.17		2.340	2.760	3.070	3.253	3.342	3.367	3.348	3.612	4.023	4.122	4.157
0.18		2.199	2.595	2.900	3.094	3.200	3.242	3.239	3.446	3.797	3.899	3.943
0.19		2.071	2.441	2.740	2.942	3.061	3.118	3.130	3.295	3.593	3.695	3.745
0.20		1.953	2.299	2.589	2.796	2.927	2.997	3.022	3.154	3.408	3.509	3.564
0.22		1.748	2.046	2.315	2.525	2.671	2.763	2.811	2.902	3.086	3.183	3.242
0.24		1.577	1.832	2.076	2.281	2.436	2.543	2.609	2.680	2.815	2.906	2.967
0.25		1.502	1.737	1.969	2.169	2.326	2.438	2.512	2.578	2.695	2.783	2.844
0.26		1.434	1.650	1.869	2.064	2.221	2.337	2.417	2.481	2.584	2.669	2.730
0.28		1.313	1.495	1.689	1.872	2.026	2.148	2.238	2.299	2.383	2.462	2.523
0.30		1.211	1.363	1.534	1.702	1.851	1.974	2.070	2.134	2.206	2.281	2.341
0.32		1.123	1.251	1.400	1.553	1.694	1.816	1.915	1.982	2.048	2.119	2.178
0.34		1.047	1.154	1.284	1.422	1.554	1.672	1.772	1.842	1.905	1.974	2.032
0.35		1.013	1.111	1.231	1.362	1.490	1.606	1.705	1.776	1.838	1.906	1.964
0.36		0.980	1.070	1.182	1.306	1.429	1.542	1.641	1.714	1.775	1.842	1.899
0.38		0.921	0.997	1.094	1.205	1.318	1.425	1.522	1.595	1.657	1.722	1.778
0.40		0.868	0.932	1.017	1.115	1.218	1.319	1.412	1.487	1.548	1.612	1.668
0.42		0.821	0.875	0.949	1.036	1.130	1.224	1.313	1.387	1.449	1.511	1.566
0.44		0.777	0.825	0.888	0.965	1.051	1.138	1.223	1.295	1.357	1.418	1.472
0.45		0.757	0.801	0.861	0.933	1.014	1.098	1.181	1.252	1.314	1.374	1.428
0.46		0.738	0.779	0.834	0.903	0.980	1.061	1.141	1.211	1.272	1.332	1.385
0.48		0.701	0.737	0.786	0.847	0.917	0.991	1.066	1.134	1.194	1.252	1.305
0.50		0.667	0.700	0.743	0.797	0.860	0.928	0.998	1.064	1.123	1.179	1.230
0.55		0.592	0.618	0.651	0.692	0.741	0.796	0.854	0.912	0.966	1.018	1.067
0.60		0.528	0.551	0.578	0.610	0.648	0.692	0.740	0.790	0.838	0.885	0.930
0.65		0.473	0.494	0.517	0.543	0.573	0.609	0.648	0.690	0.733	0.775	0.816
0.70		0.425	0.445	0.465	0.487	0.513	0.541	0.574	0.609	0.647	0.684	0.721
0.80		0.347	0.366	0.383	0.401	0.419	0.440	0.462	0.488	0.515	0.544	0.573
0.90		0.286	0.304	0.320	0.335	0.350	0.366	0.383	0.402	0.422	0.444	0.467
1.00		0.239	0.255	0.270	0.284	0.298	0.311	0.324	0.339	0.354	0.371	0.389
1.10		0.202	0.217	0.231	0.243	0.255	0.267	0.278	0.290	0.303	0.316	0.330
1.20		0.172	0.185	0.198	0.210	0.221	0.232	0.242	0.252	0.262	0.273	0.285
1.30		0.148	0.160	0.172	0.183	0.193	0.202	0.212	0.220	0.230	0.239	0.249
1.40		0.129	0.139	0.150	0.160	0.169	0.178	0.187	0.194	0.202	0.211	0.219
1.50		0.113	0.123	0.132	0.141	0.150	0.158	0.166	0.174	0.181	0.188	0.195
1.60		0.100	0.109	0.117	0.125	0.133	0.141	0.148	0.156	0.162	0.169	0.175
1.70		0.089	0.096	0.104	0.111	0.119	0.126	0.132	0.138	0.144	0.151	0.157
1.80		0.080	0.087	0.093	0.100	0.107	0.113	0.119	0.127	0.132	0.137	0.143
1.90		0.072	0.078	0.084	0.090	0.096	0.102	0.108	0.112	0.118	0.124	0.129
2.00		0.065	0.070	0.076	0.082	0.087	0.093	0.098	0.101	0.107	0.112	0.117

Table 4.3.1.1. *Atomic scattering amplitudes (Å) for electrons for neutral atoms (cont.)*

$(\sin\theta)/\lambda$ ($Å^{-1}$)	Element	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As
	Z	23	24	25	26	27	28	29	30	31	32	33
	Method	RHF	RHF	RHF	RHF	RHF	RHF	RHF	RHF	RHF	RHF	RHF
0.00		8.305	6.969	7.506	7.165	6.854	6.569	5.600	6.065	7.108	7.378	7.320
0.01		8.274	6.945	7.484	7.145	6.836	6.552	5.587	6.051	7.088	7.359	7.306
0.02		8.180	6.875	7.412	7.081	6.779	6.501	5.547	6.009	7.027	7.303	7.260
0.03		8.029	6.762	7.296	6.978	6.687	6.418	5.482	5.941	6.927	7.211	7.184
0.04		7.826	6.610	7.140	6.839	6.562	6.306	5.395	5.849	6.792	7.088	7.081
0.05		7.581	6.427	6.949	6.669	6.410	6.169	5.287	5.735	6.629	6.935	6.953
0.06		7.303	6.221	6.732	6.474	6.234	6.010	5.165	5.603	6.441	6.759	6.803
0.07		7.002	5.997	6.493	6.260	6.040	5.834	5.029	5.457	6.236	6.562	6.634
0.08		6.686	5.764	6.241	6.032	5.834	5.646	4.886	5.299	6.017	6.351	6.449
0.09		6.365	5.527	5.981	5.796	5.619	5.449	4.737	5.133	5.792	6.129	6.253
0.10		6.045	5.291	5.719	5.558	5.401	5.249	4.585	4.962	5.564	5.902	6.048
0.11		5.732	5.061	5.459	5.320	5.182	5.048	4.434	4.790	5.337	5.672	5.838
0.12		5.430	4.838	5.206	5.087	4.967	4.848	4.285	4.618	5.113	5.442	5.625
0.13		5.142	4.625	4.962	4.861	4.758	4.654	4.139	4.449	4.896	5.217	5.411
0.14		4.871	4.423	4.728	4.644	4.555	4.465	3.998	4.283	4.686	4.996	5.200
0.15		4.616	4.231	4.506	4.436	4.361	4.283	3.862	4.123	4.486	4.783	4.992
0.16		4.378	4.051	4.297	4.240	4.177	4.110	3.731	3.969	4.295	4.578	4.789
0.17		4.158	3.882	4.100	4.054	4.002	3.944	3.607	3.822	4.114	4.382	4.593
0.18		3.953	3.723	3.916	3.880	3.836	3.788	3.488	3.681	3.942	4.195	4.404
0.19		3.763	3.574	3.743	3.716	3.681	3.640	3.375	3.547	3.781	4.017	4.222
0.20		3.588	3.434	3.583	3.562	3.534	3.500	3.267	3.421	3.629	3.849	4.048
0.22		3.276	3.179	3.292	3.284	3.267	3.245	3.067	3.186	3.352	3.541	3.724
0.24		3.006	2.953	3.039	3.039	3.032	3.018	2.885	2.977	3.108	3.268	3.433
0.25		2.885	2.849	2.924	2.928	2.924	2.914	2.800	2.880	2.997	3.143	3.299
0.26		2.772	2.750	2.817	2.824	2.823	2.816	2.719	2.789	2.892	3.026	3.172
0.28		2.568	2.568	2.620	2.632	2.637	2.636	2.568	2.620	2.701	2.813	2.940
0.30		2.386	2.403	2.445	2.461	1.471	2.474	2.428	2.468	2.531	2.623	2.733
0.32		2.225	2.252	2.288	2.308	2.321	2.328	2.299	2.329	2.379	2.455	2.548
0.34		2.079	2.114	2.146	2.168	2.184	2.195	2.180	2.203	2.242	2.304	2.384
0.35		2.011	2.049	2.080	2.104	2.121	2.133	2.123	2.144	2.179	2.235	2.308
0.36		1.947	1.987	2.017	2.042	2.060	2.073	2.069	2.087	2.119	2.169	2.237
0.38		1.826	1.870	1.899	1.925	1.946	1.962	1.965	1.980	2.006	2.048	2.105
0.40		1.716	1.761	1.790	1.818	1.841	1.858	1.868	1.882	1.903	1.938	1.986
0.42		1.614	1.660	1.690	1.719	1.743	1.763	1.777	1.790	1.808	1.837	1.878
0.44		1.520	1.567	1.597	1.628	1.653	1.674	1.691	1.704	1.720	1.745	1.780
0.45		1.476	1.523	1.553	1.584	1.610	1.631	1.651	1.663	1.679	1.702	1.734
0.46		1.433	1.480	1.511	1.542	1.569	1.591	1.611	1.624	1.639	1.661	1.691
0.48		1.352	1.399	1.431	1.462	1.490	1.513	1.535	1.549	1.563	1.583	1.608
0.50		1.277	1.323	1.356	1.388	1.416	1.440	1.464	1.478	1.492	1.510	1.533
0.55		1.111	1.155	1.189	1.222	1.251	1.277	1.303	1.319	1.334	1.349	1.367
0.60		0.973	1.014	1.047	1.080	1.110	1.136	1.163	1.181	1.197	1.212	1.228
0.65		0.856	0.894	0.927	0.959	0.988	1.015	1.041	1.061	1.078	1.093	1.108
0.70		0.757	0.792	0.824	0.854	0.883	0.909	0.935	0.955	0.973	0.989	1.004
0.80		0.602	0.631	0.659	0.686	0.712	0.737	0.761	0.781	0.800	0.817	0.832
0.90		0.490	0.514	0.538	0.561	0.583	0.605	0.626	0.646	0.665	0.681	0.697
1.00		0.408	0.427	0.446	0.466	0.485	0.504	0.523	0.541	0.558	0.574	0.589
1.10		0.345	0.361	0.377	0.393	0.409	0.425	0.442	0.457	0.473	0.488	0.502
1.20		0.297	0.310	0.323	0.336	0.350	0.364	0.378	0.391	0.405	0.418	0.431
1.30		0.259	0.269	0.280	0.291	0.303	0.315	0.327	0.339	0.350	0.362	0.374
1.40		0.228	0.237	0.246	0.255	0.265	0.275	0.285	0.296	0.306	0.317	0.327
1.50		0.203	0.210	0.218	0.226	0.235	0.243	0.252	0.261	0.270	0.279	0.288
1.60		0.182	0.188	0.195	0.202	0.209	0.217	0.224	0.232	0.240	0.248	0.256
1.70		0.163	0.169	0.175	0.181	0.188	0.194	0.201	0.208	0.215	0.222	0.229
1.80		0.148	0.154	0.159	0.165	0.170	0.176	0.182	0.188	0.194	0.200	0.206
1.90		0.134	0.139	0.144	0.149	0.154	0.160	0.165	0.170	0.175	0.181	0.187
2.00		0.122	0.127	0.132	0.136	0.141	0.146	0.150	0.155	0.160	0.165	0.170

Table 4.3.1.1. *Atomic scattering amplitudes (Å) for electrons for neutral atoms (cont.)*

$(\sin\theta)/\lambda$ (Å^{-1})	Element	Se	Br	Kr	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru
	Z	34	35	36	37	38	39	40	41	42	43	44
	Method	RHF	RHF	RHF	RHF	RHF	*RHF	*RHF	*RHF	*RHF	*RHF	*RHF
0.00		7.205	7.060	6.897	11.778	13.109	12.674	12.166	10.679	10.260	10.856	9.558
0.01		7.192	7.049	6.889	11.699	13.035				10.230		
0.02		7.154	7.016	6.861	11.460	12.816				10.138		
0.03		7.090	6.962	6.814	11.088	12.468				9.989		
0.04		7.004	6.888	6.750	10.613	12.013	11.79	11.41	10.13	9.790	10.35	9.18
0.05		6.895	6.795	6.670	10.073	11.476	11.34	11.04	9.86	9.548	10.10	8.99
0.06		6.767	6.684	6.574	9.504	10.888	10.84	10.62	9.54	9.272	9.80	8.77
0.07		6.621	6.558	6.464	8.934	10.273	10.31	10.15	9.20	8.972	9.48	8.53
0.08		6.460	6.418	6.341	8.385	9.655	9.77	9.68	8.85	8.655	9.14	8.27
0.09		6.288	6.266	6.207	7.872	9.052	9.23	9.20	8.49	8.330	8.78	8.00
0.10		6.105	6.104	6.064	7.402	8.478	8.70	8.72	8.12	8.004	8.42	7.73
0.11		5.916	5.935	5.913	6.976	7.940	8.20	8.26	7.77	7.680	8.07	7.46
0.12		5.722	5.760	5.755	6.593	7.443	7.722	7.818	7.421	7.364	7.720	7.190
0.13		5.525	5.580	5.593	6.248	6.988	7.278	7.400	7.090	7.058	7.383	6.928
0.14		5.328	5.399	5.428	5.938	6.575	6.865	7.007	6.772	6.763	7.057	6.672
0.15		5.132	5.217	5.260	5.658	6.200	6.485	6.640	6.472	6.481	6.746	6.426
0.16		4.938	5.036	5.092	5.403	5.862	6.136	6.299	6.187	6.213	6.451	6.188
0.17		4.749	4.857	4.925	5.170	5.555	5.816	5.983	5.918	5.957	6.171	5.960
0.18		4.564	4.680	4.759	4.954	5.278	5.523	5.689	5.665	5.715	5.907	5.741
0.19		4.384	4.507	4.595	4.754	5.025	5.254	5.419	5.427	5.486	5.658	5.533
0.20		4.211	4.339	4.434	4.566	4.794	5.008	5.168	5.203	5.269	5.423	5.332
0.22		3.884	4.017	4.123	4.224	4.387	4.570	4.721	4.792	4.868	4.994	4.959
0.24		3.585	3.718	3.829	3.916	4.039	4.195	4.333	4.426	4.507	4.614	4.618
0.25		3.446	3.578	3.690	3.773	3.882	4.027	4.158	4.258	4.341	4.439	4.459
0.26		3.314	3.443	3.556	3.636	3.735	3.869	3.995	4.099	4.182	4.273	4.306
0.28		3.069	3.192	3.303	3.382	3.465	3.583	3.697	3.804	3.888	3.969	4.021
0.30		2.849	2.963	3.071	3.149	3.224	3.329	3.433	3.539	3.622	3.695	3.759
0.32		2.651	2.757	2.858	2.936	3.007	3.101	3.196	3.298	3.379	3.448	3.518
0.34		2.475	2.570	2.665	2.742	2.810	2.895	2.982	3.080	3.158	3.223	3.296
0.35		2.393	2.484	2.575	2.651	2.718	2.799	2.883	2.978	3.054	3.118	3.192
0.36		2.316	2.402	2.490	2.564	2.630	2.708	2.789	2.880	2.955	3.018	3.092
0.38		2.173	2.250	2.330	2.402	2.466	2.538	2.613	2.698	2.770	2.830	2.904
0.40		2.045	2.113	2.186	2.254	2.315	2.383	2.452	2.531	2.600	2.658	2.730
0.42		1.929	1.989	2.055	2.119	2.178	2.241	2.305	2.379	2.444	2.500	2.570
0.44		1.824	1.877	1.936	1.995	2.052	2.111	2.171	2.239	2.300	2.355	2.421
0.45		1.776	1.825	1.881	1.938	1.993	2.049	2.108	2.173	2.233	2.287	2.351
0.46		1.729	1.775	1.828	1.883	1.936	1.991	2.047	2.110	2.168	2.221	2.284
0.48		1.642	1.683	1.730	1.780	1.830	1.881	1.934	1.991	2.046	2.098	2.157
0.50		1.562	1.598	1.640	1.686	1.733	1.780	1.829	1.883	1.934	1.984	2.040
0.55		1.389	1.416	1.447	1.483	1.522	1.562	1.603	1.646	1.690	1.734	1.782
0.60		1.245	1.266	1.290	1.319	1.350	1.383	1.417	1.452	1.490	1.528	1.569
0.65		1.124	1.141	1.160	1.182	1.208	1.235	1.263	1.292	1.324	1.357	1.391
0.70		1.019	1.034	1.050	1.068	1.089	1.111	1.135	1.159	1.185	1.214	1.243
0.80		0.847	0.860	0.873	0.887	0.902	0.918	0.935	0.952	0.971	0.992	1.013
0.90		0.711	0.725	0.737	0.749	0.762	0.774	0.787	0.800	0.814	0.830	0.845
1.00		0.603	0.616	0.628	0.640	0.651	0.662	0.673	0.684	0.695	0.707	0.719
1.10		0.515	0.528	0.540	0.551	0.562	0.572	0.582	0.591	0.601	0.611	0.621
1.20		0.444	0.456	0.467	0.478	0.488	0.498	0.507	0.516	0.525	0.534	0.542
1.30		0.385	0.396	0.407	0.417	0.427	0.436	0.445	0.454	0.462	0.470	0.478
1.40		0.337	0.347	0.357	0.365	0.375	0.384	0.393	0.401	0.408	0.416	0.423
1.50		0.297	0.306	0.315	0.325	0.333	0.341	0.349	0.356	0.364	0.371	0.378
1.60		0.264	0.272	0.280	0.290	0.297	0.303	0.311	0.318	0.325	0.332	0.338
1.70		0.236	0.243	0.250	0.257	0.264	0.272	0.278	0.285	0.291	0.298	0.304
1.80		0.212	0.219	0.225	0.233	0.239	0.244	0.251	0.257	0.263	0.269	0.275
1.90		0.192	0.198	0.204	0.208	0.214	0.221	0.227	0.233	0.238	0.244	0.249
2.00		0.175	0.180	0.185	0.188	0.194	0.201	0.206	0.211	0.216	0.222	0.227

Table 4.3.1.1. *Atomic scattering amplitudes (Å) for electrons for neutral atoms (cont.)*

$(\sin\theta)/\lambda$ (Å^{-1})	Element	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	Cs
	Z	45	46	47	48	49	50	51	52	53	54	55
	Method	*RHF	*RHF	RHF	RHF	RHF	RHF	RHF	*RHF	RHF	RHF	RHF
0.00		9.242	7.583	8.671	9.232	10.434	10.859	10.974	11.003	10.905	10.794	16.508
0.01				8.654	9.213	10.406	10.833	10.950		10.887	10.777	16.391
0.02				8.599	9.153	10.320	10.750	10.876		10.828	10.725	16.050
0.03				8.510	9.057	10.181	10.615	10.755		10.731	10.638	15.521
0.04		8.90	7.43	8.391	8.926	9.995	10.433	10.591	10.65	10.599	10.520	14.855
0.05		8.73	7.35	8.244	8.764	9.768	10.209	10.387	10.47	10.434	10.371	14.106
0.06		8.53	7.26	8.075	8.577	9.509	9.950	10.150	10.25	10.238	10.194	13.326
0.07		8.31	7.16	7.888	8.369	9.224	9.664	9.884	10.01	10.017	9.993	12.556
0.08		8.01	7.03	7.689	8.144	8.923	9.357	9.596	9.74	9.773	9.771	11.823
0.09		7.83	6.91	7.480	7.909	8.612	9.037	9.291	9.46	9.511	9.530	11.145
0.10		7.58	6.77	7.267	7.666	8.297	8.709	8.976	9.16	9.235	9.274	10.525
0.11		7.33	6.62	7.052	7.421	7.983	8.380	8.654	8.85	8.948	9.007	9.965
0.12		7.079	6.474	6.837	7.176	7.674	8.053	8.331	8.538	8.654	8.732	9.458
0.13		6.836	6.319	6.625	6.933	7.374	7.732	8.010	8.224	8.357	8.451	9.000
0.14		6.598	6.162	6.418	6.695	7.084	7.419	7.694	7.914	8.059	8.167	8.583
0.15		6.366	6.003	6.215	6.464	6.805	7.118	7.386	7.608	7.764	7.884	8.201
0.16		6.143	5.843	6.018	6.240	6.539	6.829	7.088	7.309	7.472	7.603	7.848
0.17		5.929	5.684	5.827	6.024	6.286	6.552	6.800	7.018	7.186	7.325	7.519
0.18		5.722	5.526	5.643	5.817	6.045	6.289	6.524	6.738	6.908	7.053	7.212
0.19		5.524	5.369	5.464	5.618	5.817	6.039	6.261	6.467	6.639	6.787	6.922
0.20		5.334	5.214	5.293	5.427	5.601	5.803	6.010	6.209	6.379	6.529	6.649
0.22		4.976	4.913	4.967	5.070	5.203	5.368	5.547	5.727	5.889	6.039	6.143
0.24		4.648	4.626	4.665	4.745	4.846	4.979	5.131	3.291	5.442	5.586	5.684
0.25		4.493	4.487	4.522	4.592	4.682	4.801	4.940	5.090	5.234	5.374	5.471
0.26		4.345	4.352	4.384	4.447	4.525	4.633	4.760	4.899	5.036	5.172	5.268
0.28		4.066	4.093	4.122	4.173	4.236	4.323	4.428	4.548	4.670	4.795	4.890
0.30		3.809	3.850	3.878	3.922	3.973	4.044	4.131	4.234	4.341	4.454	4.547
0.32		3.572	3.622	3.651	3.690	3.734	3.792	3.865	3.952	4.046	4.147	4.235
0.34		3.353	3.408	3.440	3.476	3.515	3.564	3.625	3.700	3.780	3.870	3.953
0.35		3.249	3.306	3.339	3.375	3.412	3.458	3.514	3.583	3.658	3.742	3.822
0.36		3.150	3.208	3.242	3.278	3.313	3.356	3.408	3.472	3.541	3.620	3.697
0.38		2.962	3.022	3.058	3.093	3.127	3.165	3.210	3.265	3.325	3.394	3.465
0.40		2.788	2.848	2.886	2.922	2.955	2.990	3.030	3.078	3.130	3.191	3.255
0.42		2.626	2.686	2.726	2.762	2.795	2.828	2.864	2.907	2.953	3.006	3.064
0.44		2.477	2.535	2.576	2.613	2.646	2.678	2.712	2.750	2.791	2.838	2.890
0.45		2.406	2.464	2.505	2.542	2.576	2.608	2.640	2.677	2.715	2.759	2.809
0.46		2.338	2.395	2.436	2.474	2.507	2.539	2.571	2.606	2.642	2.684	2.731
0.48		2.210	2.264	2.306	2.344	2.378	2.409	2.440	2.473	2.506	2.543	2.586
0.50		2.090	2.143	2.185	2.223	2.257	2.288	2.318	2.350	2.380	2.414	2.453
0.55		1.828	1.875	1.915	1.953	1.987	2.019	2.048	2.077	2.104	2.132	2.163
0.60		1.609	1.650	1.688	1.724	1.758	1.790	1.819	1.847	1.871	1.897	1.923
0.65		1.426	1.462	1.497	1.531	1.563	1.594	1.622	1.649	1.673	1.697	1.721
0.70		1.273	1.304	1.335	1.366	1.397	1.426	1.453	1.479	1.503	1.526	1.548
0.80		1.035	1.058	1.082	1.107	1.132	1.157	1.181	1.205	1.227	1.248	1.269
0.90		0.861	0.879	0.897	0.916	0.936	0.956	0.976	0.997	1.016	1.036	1.055
1.00		0.731	0.745	0.758	0.773	0.789	0.805	0.821	0.838	0.855	0.871	0.888
1.10		0.631	0.641	0.652	0.664	0.676	0.688	0.701	0.715	0.729	0.743	0.758
1.20		0.551	0.559	0.568	0.578	0.587	0.597	0.608	0.619	0.630	0.642	0.654
1.30		0.485	0.493	0.500	0.508	0.516	0.525	0.533	0.542	0.551	0.561	0.570
1.40		0.431	0.437	0.444	0.451	0.458	0.465	0.472	0.480	0.487	0.495	0.502
1.50		0.384	0.391	0.397	0.403	0.409	0.416	0.422	0.428	0.435	0.442	0.450
1.60		0.345	0.351	0.357	0.362	0.368	0.374	0.379	0.385	0.391	0.397	0.405
1.70		0.310	0.316	0.321	0.327	0.332	0.337	0.343	0.348	0.353	0.358	0.363
2.80		0.281	0.286	0.291	0.297	0.302	0.307	0.311	0.316	0.321	0.325	0.332
1.90		0.255	0.260	0.265	0.270	0.274	0.279	0.284	0.288	0.293	0.297	0.299
2.00		0.232	0.237	0.241	0.246	0.250	0.255	0.259	0.264	0.268	0.272	0.272

Table 4.3.1.1. *Atomic scattering amplitudes (Å) for electrons for neutral atoms (cont.)*

$(\sin\theta)/\lambda$ (Å^{-1})	Element	Ba	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy
	Z	56	57	58	59	60	61	62	63	64	65	66
	Method	RHF	*RHF	*RHF	*RMF	*RHF	*RHF	*RHF	RHF	*RHF	*RHF	*RHF
0.00		18.267	17.805	17.378	16.987	16.606	16.243	15.897	15.563	15.266	14.974	14.641
0.01		18.157							15.486			
0.02		17.828							15.260			
0.03		17.309							14.898			
0.04		16.636	16.45	16.10	15.62	15.30	14.99	14.70	14.425	14.30	13.90	13.64
0.05		15.854	15.79	15.46	14.94	14.67	14.39	14.12	13.867	13.81	13.37	13.14
0.06		15.008	15.05	14.77	14.22	13.97	13.72	13.48	13.253	13.27	12.81	12.60
0.07		14.138	14.28	14.03	13.47	13.25	13.03	12.81	12.611	12.70	12.22	12.03
0.08		13.278	13.51	13.29	12.72	12.52	12.33	12.14	11.963	12.11	11.62	11.44
0.09		12.431	12.74	12.56	11.99	11.82	11.65	11.49	11.329	11.52	11.02	10.87
0.10		11.675	12.01	11.85	11.29	11.15	11.00	10.86	10.722	10.95	10.45	10.32
0.11		10.958	11.32	11.19	10.65	10.52	10.40	10.27	10.150	10.39	9.91	9.79
0.12		10.302	10.671	10.561	10.052	9.944	9.833	9.722	9.618	9.871	9.407	9.303
0.13		9.707	10.072	9.981	9.506	9.412	9.316	9.218	9.128	9.382	8.942	8.848
0.14		9.168	9.522	9.448	9.008	8.928	8.843	8.758	8.678	8.926	8.512	8.429
0.15		8.682	9.017	8.958	8.556	8.486	8.413	8.336	8.267	8.505	8.121	8.045
0.16		8.241	8.555	8.507	8.144	8.084	8.020	7.953	7.891	8.114	7.761	7.693
0.17		7.840	8.131	8.094	7.768	7.717	7.661	7.602	7.548	7.754	7.430	7.370
0.18		7.474	7.742	7.714	7.424	7.380	7.332	7.280	7.232	7.422	7.128	7.073
0.19		7.139	7.384	7.365	7.107	7.071	7.029	6.983	6.942	7.114	6.849	6.800
0.20		6.829	7.053	7.041	6.815	6.785	6.749	6.710	6.673	6.828	6.591	6.547
0.22		6.275	6.462	6.462	6.291	6.272	6.247	6.218	6.191	6.316	6.127	6.092
0.24		5.791	5.948	5.957	5.831	5.822	5.806	5.787	5.768	5.868	5.720	5.693
0.25		5.570	5.714	5.728	5.620	5.615	5.605	5.589	5.574	5.664	5.534	5.510
0.26		5.361	5.495	5.312	5.421	5.421	5.413	5.402	5.390	5.472	5.358	5.337
0.28		4.975	5.092	5.115	5.053	5.059	5.059	5.055	5.030	5.117	5.030	5.016
0.30		4.628	4.730	4.759	4.719	4.731	4.737	4.739	4.740	4.796	4.731	4.723
0.32		4.313	4.405	4.438	4.414	4.432	4.443	4.450	4.456	4.504	4.457	4.454
0.34		4.028	4.111	4.146	4.136	4.157	4.173	4.185	4.195	4.238	4.205	4.206
0.35		3.893	3.974	4.010	4.006	4.029	4.047	4.060	4.072	4.113	4.086	4.089
0.36		3.769	3.844	3.881	3.882	3.906	3.925	3.940	3.954	3.993	3.971	3.976
0.38		3.533	3.602	3.640	3.648	3.675	3.697	3.715	3.731	3.767	3.755	3.763
0.40		3.318	3.381	3.420	3.434	3.462	3.486	3.306	3.525	3.559	3.554	3.565
0.42		3.123	3.180	3.219	3.238	3.267	3.292	3.314	3.335	3.367	3.368	3.380
0.44		2.944	2.997	3.035	3.057	3.087	3.114	3.137	3.159	3.189	3.194	3.209
0.43		2.861	2.911	2.949	2.973	3.003	3.029	3.053	3.075	3.105	3.113	3.128
0.46		2.781	2.829	2.866	2.891	2.922	2.948	2.973	2.995	3.025	3.034	3.050
0.48		2.631	2.676	2.712	2.739	2.769	2.796	2.821	2.844	2.872	2.884	2.901
0.50		2.494	2.535	2.570	2.598	2.628	2.655	2.680	2.703	2.730	2.745	2.763
0.55		2.197	2.230	2.262	2.291	2.320	2.346	2.371	2.394	2.419	2.457	2.456
0.60		1.951	1.979	2.008	2.037	2.064	2.089	2.113	2.156	2.138	2.178	2.197
0.65		1.745	1.770	1.796	1.824	1.849	1.872	1.895	1.917	1.937	1.958	1.977
0.70		1.570	1.592	1.617	1.643	1.666	1.688	1.709	1.730	1.749	1.770	1.788
0.80		1.288	1.308	1.329	1.351	1.372	1.391	1.411	1.429	1.446	1.465	1.482
0.90		1.073	1.090	1.109	1.128	1.146	1.164	1.181	1.198	1.213	1.231	1.246
1.00		0.904	0.920	0.936	0.953	0.969	0.985	1.000	1.016	1.030	1.045	1.060
1.10		0.772	0.785	0.799	0.814	0.828	0.842	0.856	0.870	0.883	0.897	0.910
1.20		0.666	0.678	0.690	0.702	0.715	0.727	0.739	0.752	0.763	0.776	0.787
1.30		0.580	0.391	0.602	0.612	0.623	0.634	0.644	0.655	0.666	0.676	0.687
1.40		0.511	0.521	0.530	0.539	0.548	0.557	0.566	0.575	0.383	0.595	0.604
1.50		0.436	0.463	0.470	0.478	0.486	0.494	0.502	0.511	0.519	0.527	0.535
1.60		0.411	0.415	0.421	0.428	0.435	0.442	0.449	0.457	0.463	0.470	0.478
1.70		0.367	0.374	0.380	0.386	0.392	0.398	0.404	0.409	0.416	0.423	0.429
1.80		0.337	0.340	0.345	0.350	0.355	0.360	0.366	0.372	0.377	0.382	0.388
1.90		0.304	0.310	0.314	0.319	0.324	0.328	0.333	0.337	0.343	0.348	0.353
2.00		0.277	0.284	0.288	0.292	0.296	0.301	0.305	0.307	0.313	0.318	0.322

Table 4.3.1.1. *Atomic scattering amplitudes (Å) for electrons for neutral atoms (cont.)*

$(\sin\theta)/\lambda$ (Å^{-1})	Element Z Method	Ho 67 *RHF	Er 68 *RHF	Tm 69 *RHF	Yb 70 *RHF	Lu 71 *RHF	Hf 72 *RHF	Ta 73 *RHF	W 74 *RHF	Re 75 *RHF	Os 76 *RHF	Ir 77 *RHF
0.00		14.355	14.080	13.814	13.557	13.486	13.177	12.856	12.543	12.263	11.987	11.718
0.01												
0.02												
0.03												
0.04		13.57	13.16	12.92	12.70	12.74	12.55	12.31	12.06	11.83	11.59	11.37
0.05		13.14	12.70	12.48	12.28	12.38	12.23	12.01	11.80	11.60	11.39	11.18
0.06		12.66	12.19	12.00	11.81	11.95	11.85	11.69	11.51	11.34	11.15	10.96
0.07		12.15	11.66	11.48	11.31	11.50	11.45	11.33	11.18	11.04	10.88	10.72
0.08		11.61	11.11	10.96	10.80	11.03	11.02	10.95	10.83	10.73	10.59	10.45
0.09		11.08	10.58	10.44	10.29	10.55	10.59	10.55	10.47	10.40	10.29	10.17
0.10		10.55	10.06	9.93	9.80	10.08	10.16	10.15	10.10	10.05	9.98	9.88
0.11		10.05	9.56	9.45	9.33	9.62	9.73	9.75	9.74	9.71	9.65	9.58
0.12		9.562	9.095	8.994	8.892	9.180	9.308	9.363	9.369	9.366	9.334	9.281
0.13		9.108	8.662	8.571	8.480	8.762	8.907	8.982	9.011	9.028	9.016	8.982
0.14		8.681	8.262	8.180	8.098	8.370	8.525	8.616	8.663	8.697	8.702	8.686
0.15		8.284	7.895	7.821	7.746	8.001	8.163	8.266	8.327	8.376	8.396	8.395
0.16		7.917	7.557	7.490	7.421	7.660	7.822	7.933	8.006	8.067	8.099	8.111
0.17		7.577	7.247	7.185	7.123	7.343	7.502	7.617	7.699	7.769	7.813	7.836
0.18		7.262	6.962	6.905	6.849	7.047	7.202	7.321	7.408	7.485	7.537	7.570
0.19		6.971	6.698	6.646	6.595	6.774	6.922	7.040	7.132	7.213	7.272	7.313
0.20		6.700	6.454	6.407	6.360	6.520	6.660	6.776	6.870	6.954	7.019	7.067
0.22		6.213	6.017	5.978	5.938	6.063	6.185	6.295	6.388	6.475	6.547	6.604
0.24		5.788	5.632	5.601	5.568	5.664	5.768	5.867	5.957	6.043	6.117	6.180
0.25		5.595	5.457	5.428	5.398	5.483	5.578	5.672	5.759	5.843	5.917	5.982
0.26		5.412	5.290	5.265	5.238	5.312	5.399	5.487	5.571	5.653	5.727	5.792
0.28		5.075	4.981	4.961	4.940	4.996	5.069	5.147	5.224	5.301	5.372	5.437
0.30		4.771	4.699	4.685	4.669	4.712	4.772	4.840	4.910	4.981	5.049	5.113
0.32		4.494	4.440	4.430	4.419	4.453	4.503	4.563	4.626	4.691	4.755	4.816
0.34		4.240	4.200	4.195	4.188	4.215	4.258	4.310	4.366	4.425	4.485	4.543
0.35		4.121	4.087	4.084	4.078	4.103	4.143	4.191	4.245	4.301	4.359	4.415
0.36		4.007	3.978	3.976	3.973	3.996	4.033	4.078	4.129	4.182	4.237	4.293
0.38		3.790	3.771	3.773	3.773	3.793	3.825	3.865	3.910	3.959	4.010	4.061
0.40		3.591	3.579	3.583	3.586	3.604	3.632	3.668	3.709	3.753	3.800	3.848
0.42		3.405	3.399	3.406	3.411	3.429	3.454	3.486	3.523	3.563	3.606	3.651
0.44		3.233	3.232	3.241	3.248	3.265	3.288	3.317	3.350	3.387	3.427	3.468
0.45		3.151	3.153	3.162	3.170	3.187	3.209	3.237	3.269	3.304	3.342	3.382
0.46		3.073	3.076	3.086	3.095	3.111	3.133	3.159	3.190	3.224	3.260	3.299
0.48		2.924	2.930	2.942	2.952	2.968	2.988	3.013	3.041	3.072	3.105	3.141
0.50		2.785	2.793	2.806	2.818	2.834	2.853	2.876	2.902	2.930	2.961	2.994
0.55		2.477	2.490	2.505	2.518	2.534	2.551	2.571	2.592	2.616	2.641	2.669
0.60		2.216	2.232	2.248	2.263	2.278	2.294	2.311	2.330	2.349	2.371	2.394
0.65		1.995	2.012	2.028	2.043	2.058	2.073	2.089	2.105	2.122	2.140	2.160
0.70		1.085	1.823	1.839	1.854	1.868	1.882	1.896	1.911	1.926	1.942	1.959
0.80		1.497	1.515	1.530	1.545	1.558	1.571	1.583	1.596	1.608	1.621	1.634
0.90		1.260	1.276	1.291	1.305	1.317	1.329	1.341	1.352	1.363	1.374	1.385
1.00		1.073	1.088	1.101	1.114	1.126	1.138	1.148	1.159	1.169	1.179	1.189
1.10		0.922	0.935	0.948	0.960	0.971	0.982	0.993	1.003	1.012	1.022	1.031
1.20		0.799	0.811	0.822	0.833	0.844	0.854	0.864	0.874	0.883	0.892	0.901
1.30		0.698	0.708	0.719	0.729	0.739	0.748	0.758	0.767	0.776	0.784	0.793
1.40		0.614	0.623	0.632	0.642	0.651	0.660	0.668	0.677	0.685	0.694	0.702
1.50		0.544	0.552	0.560	0.569	0.577	0.585	0.593	0.601	0.609	0.617	0.624
1.60		0.485	0.492	0.500	0.507	0.515	0.522	0.530	0.537	0.544	0.551	0.558
1.70		0.436	0.442	0.449	0.455	0.462	0.469	0.475	0.482	0.489	0.495	0.502
1.80		0.394	0.399	0.405	0.411	0.417	0.423	0.429	0.435	0.441	0.447	0.453
1.90		0.358	0.363	0.368	0.373	0.379	0.384	0.389	0.395	0.400	0.406	0.411
2.00		0.327	0.331	0.336	0.341	0.345	0.350	0.355	0.360	0.365	0.370	0.374

Table 4.3.1.1. *Atomic scattering amplitudes (Å) for electrons for neutral atoms (cont.)*

$(\sin\theta)/\lambda$ ($Å^{-1}$)	Element	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	Fr	Ra
	Z	78	79	80	81	82	83	84	85	86	87	88
	Method	*RHF	RHF	RHF	*RHF	RHF	RHF	*RHF	*RHF	RHF	*RHF	*RHF
0.00		10.813	10.573	10.964	12.109	12.597	13.096	13.368	13.473	13.492	18.715	20.561
0.01			10.559	10.948		12.573	13.070			13.470		
0.02			10.511	10.897		12.494	12.989			13.403		
0.03			10.434	10.813		12.366	12.857			13.292		
0.04		10.55	10.328	10.698	11.71	12.193	12.678	12.95	13.09	13.139	17.14	18.94
0.05		10.40	10.195	10.555	11.51	11.979	12.456	12.74	12.89	12.949	16.41	18.15
0.06		10.23	10.040	10.387	11.27	11.730	12.197	12.49	12.65	12.724	15.64	17.31
0.07		10.03	9.865	10.197	11.00	11.454	11.908	12.21	12.38	12.469	14.87	16.42
0.08		9.82	9.673	9.989	10.72	11.155	11.595	11.90	12.08	12.187	14.13	15.54
0.09		9.60	9.467	9.766	10.42	10.840	11.264	11.57	11.76	11.884	13.42	14.69
0.10		9.37	9.251	9.533	10.12	10.516	10.921	11.22	11.43	11.565	12.77	13.88
0.11		9.13	9.028	9.291	9.81	10.186	10.571	10.87	11.08	11.232	12.16	13.12
0.12		8.882	8.799	9.045	9.500	9.855	10.219	10.509	10.729	10.892	11.605	12.419
0.13		8.636	8.568	8.796	9.195	9.527	9.869	10.153	10.375	10.546	11.093	11.776
0.14		8.389	8.337	8.547	8.896	9.203	9.523	9.798	10.021	10.199	10.620	11.187
0.15		8.145	8.106	8.299	8.603	8.888	9.186	9.449	9.671	9.854	10.180	10.648
0.16		7.904	7.877	8.055	8.320	8.581	8.857	9.109	9.328	9.512	9.770	10.155
0.17		7.667	7.652	7.815	8.046	8.285	8.539	8.779	8.991	9.177	9.386	9.702
0.18		7.436	7.431	7.579	7.781	7.999	8.233	8.459	8.666	8.849	9.023	9.285
0.19		7.210	7.214	7.350	7.526	7.724	7.939	8.151	8.350	8.531	8.681	8.899
0.20		6.991	7.003	7.128	7.282	7.461	7.658	7.856	8.046	8.223	8.356	8.540
0.22		6.572	6.598	6.702	6.822	6.969	7.132	7.303	3.474	7.639	7.754	7.891
0.24		6.181	6.216	6.305	6.399	6.520	6.654	6.800	6.952	7.102	7.208	7.318
0.25		5.995	6.035	6.116	6.201	6.310	6.432	6.567	6.709	6.852	6.954	7.055
0.26		5.817	5.859	5.934	6.011	6.110	6.221	6.345	6.477	6.612	6.712	6.807
0.28		5.478	5.525	5.591	5.654	5.736	5.828	5.933	6.047	6.166	6.261	6.347
0.30		5.164	5.214	5.272	5.327	5.395	5.472	5.560	5.658	5.762	5.852	5.931
0.32		4.873	4.924	4.976	5.025	5.083	5.148	5.222	5.305	5.397	5.480	5.555
0.34		4.603	4.654	4.702	4.746	4.797	4.852	4.915	4.987	5.065	5.141	5.212
0.35		4.475	4.526	4.572	4.614	4.662	4.714	4.772	4.838	4.912	4.984	5.053
0.36		4.352	4.403	4.447	4.488	4.533	4.581	4.636	4.697	4.765	4.834	4.900
0.38		4.120	4.169	4.211	4.249	4.290	4.333	4.380	4.433	4.492	4.555	4.616
0.40		3.905	3.952	3.991	4.028	4.066	4.104	4.146	4.192	4.244	4.300	4.356
0.42		3.704	3.750	3.787	3.823	3.858	3.893	3.931	3.972	4.017	4.067	4.118
0.44		3.518	3.562	3.597	3.632	3.665	3.698	3.732	3.769	3.808	3.854	3.901
0.45		3.430	3.472	3.507	3.541	3.573	3.606	3.639	3.673	3.711	3.754	3.798
0.46		3.345	3.386	3.420	3.454	3.485	3.517	3.548	3.582	3.617	3.658	3.700
0.48		3.184	3.223	3.256	3.288	3.318	3.348	3.378	3.408	3.441	3.477	3.516
0.50		3.034	3.070	3.102	3.133	3.162	3.191	3.219	3.248	3.277	3.311	3.346
0.55		2.701	2.732	2.760	2.789	2.816	2.842	2.868	2.893	2.918	2.945	2.974
0.60		2.420	2.446	2.471	2.497	2.522	2.546	2.570	2.593	2.616	2.639	2.663
0.65		2.181	2.203	2.225	2.248	2.271	2.293	2.315	2.337	2.358	2.378	2.399
0.70		1.976	1.995	2.015	2.035	2.055	2.076	2.096	2.116	2.135	2.154	2.173
0.80		1.647	1.661	1.676	1.692	1.708	1.725	1.742	1.758	1.775	1.791	1.808
0.90		1.396	1.407	1.419	1.431	1.444	1.457	1.471	1.485	1.499	1.513	1.527
1.00		1.198	1.208	1.218	1.228	1.239	1.249	1.260	1.272	1.283	1.295	1.307
1.10		1.040	1.048	1.057	1.066	1.075	1.084	1.093	1.102	1.112	1.122	1.132
1.20		0.909	0.918	0.926	0.934	0.942	0.949	0.957	0.965	0.974	0.982	0.990
1.30		0.801	0.809	0.816	0.824	0.831	0.838	0.846	0.853	0.860	0.867	0.874
1.40		0.709	0.717	0.724	0.731	0.738	0.745	0.752	0.758	0.765	0.771	0.778
1.50		0.632	0.639	0.646	0.653	0.659	0.666	0.672	0.678	0.684	0.690	0.696
1.60		0.565	0.572	0.579	0.585	0.591	0.598	0.603	0.609	0.615	0.621	0.626
1.70		0.508	0.514	0.521	0.527	0.533	0.538	0.544	0.550	0.555	0.561	0.566
1.80		0.459	0.465	0.471	0.476	0.482	0.488	0.493	0.498	0.503	0.508	0.513
1.90		0.416	0.422	0.427	0.432	0.438	0.443	0.448	0.453	0.458	0.463	0.468
2.00		0.379	0.384	0.389	0.394	0.399	0.404	0.409	0.413	0.418	0.423	0.427

Table 4.3.1.1. *Atomic scattering amplitudes (Å) for electrons for neutral atoms (cont.)*

$(\sin\theta)/\lambda$ (Å^{-1})	Element	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf
	Z	89	90	91	92	93	94	95	96	97	98
	Method	*RHF	*RHF	*RHF	RHF	*RHF	*RHF	*RHF	*RHF	*RHF	*RHF
0.00		20.484	20.115	19.568	19.119	18.759	18.191	17.840	17.710	17.406	16.841
0.01					19.047						
0.02					18.825						
0.03					18.470						
0.04		19.10	18.92	18.37	17.999	17.70	17.10	16.80	16.80	16.53	16.28
0.05		18.41	18.33	17.77	17.436	17.16	16.55	16.28	16.33	16.08	15.85
0.06		17.64	17.66	17.11	16.805	16.55	15.95	15.70	15.80	15.58	15.37
0.07		16.84	16.93	16.39	16.131	15.91	15.31	15.09	15.24	15.04	14.84
0.08		16.01	16.19	15.66	15.436	15.25	14.65	14.47	14.66	14.48	14.30
0.09		15.19	15.43	14.92	14.738	14.58	14.00	13.84	14.06	13.91	13.75
0.10		14.40	14.68	14.20	14.052	13.92	13.37	13.24	13.47	13.33	13.20
0.11		13.64	13.95	13.51	13.389	13.28	12.76	12.65	12.90	12.78	12.66
0.12		12.923	13.255	12.850	12.756	12.665	12.191	12.095	12.344	12.241	12.135
0.13		12.253	12.594	12.228	12.157	12.085	11.653	11.572	11.817	11.729	11.637
0.14		11.632	11.972	11.646	11.595	11.540	11.149	11.083	11.319	11.243	11.164
0.15		11.058	11.388	11.102	11.069	11.029	10.679	10.626	10.848	10.784	10.716
0.16		10.528	10.845	10.597	10.579	10.551	10.243	10.200	10.407	10.353	10.294
0.17		10.038	10.339	10.128	10.122	10.104	9.836	9.803	9.993	9.948	9.898
0.18		9.586	9.868	9.691	9.696	9.688	9.457	9.433	9.605	9.568	9.527
0.19		9.168	9.430	9.285	9.299	9.300	9.102	9.086	9.241	9.212	9.178
0.20		8.780	9.022	8.906	8.928	8.936	8.770	8.760	8.900	8.878	8.850
0.22		8.083	8.287	8.221	8.254	8.275	8.163	8.164	8.277	8.266	8.249
0.24		7.474	7.645	7.617	7.659	7.689	7.619	7.631	7.721	7.720	7.713
0.25		7.196	7.353	7.341	7.387	7.420	7.368	7.384	7.465	7.468	7.466
0.26		6.935	7.079	7.081	7.129	7.165	7.129	7.148	7.222	7.229	7.231
0.28		6.455	6.578	6.600	6.652	6.694	6.683	6.708	6.770	6.784	6.793
0.30		6.025	6.129	6.167	6.221	6.266	6.274	6.304	6.358	6.378	6.393
0.32		5.637	5.727	5.775	5.830	5.878	5.899	5.933	5.981	6.006	6.026
0.34		5.285	5.364	5.418	5.473	5.523	5.553	5.591	5.635	5.664	5.687
0.35		5.122	5.196	5.252	5.307	5.357	5.391	5.429	5.472	5.502	5.528
0.36		4.966	5.036	5.093	5.148	5.197	5.235	5.274	5.316	5.347	5.374
0.38		4.675	4.738	4.796	4.850	4.899	4.940	4.981	5.021	5.055	5.084
0.40		4.410	4.466	4.524	4.576	4.625	4.669	4.710	4.749	4.784	4.815
0.42		4.168	4.218	4.275	4.325	4.372	4.417	4.459	4.497	4.532	4.565
0.44		3.946	3.992	4.046	4.094	4.140	4.185	4.226	4.263	4.299	4.333
0.45		3.842	3.885	3.938	3.985	4.030	4.076	4.116	4.152	4.189	4.222
0.46		3.742	3.784	3.835	3.881	3.925	3.970	4.010	4.046	4.082	4.116
0.48		3.554	3.592	3.641	3.685	3.727	3.771	3.810	3.844	3.880	3.914
0.50		3.381	3.416	3.462	3.503	3.543	3.586	3.624	3.657	3.693	3.726
0.55		3.003	3.032	3.071	3.106	3.141	3.179	3.213	3.244	3.277	3.309
0.60		2.687	2.712	2.744	2.775	2.805	2.839	2.869	2.897	2.927	2.957
0.65		2.421	2.442	2.470	2.495	2.522	2.551	2.578	2.603	2.630	2.657
0.70		2.193	2.212	2.235	2.257	2.280	2.306	2.330	2.352	2.376	2.400
0.80		1.824	1.840	1.857	1.875	1.893	1.912	1.930	1.949	1.968	1.987
0.90		1.541	1.554	1.568	1.582	1.597	1.611	1.626	1.641	1.657	1.673
1.00		1.318	1.330	1.342	1.353	1.365	1.377	1.389	1.402	1.415	1.427
1.10		1.142	1.152	1.161	1.171	1.181	1.191	1.201	1.212	1.222	1.233
1.20		0.999	1.007	1.016	1.024	1.033	1.041	1.049	1.058	1.067	1.076
1.30		0.882	0.889	0.896	0.904	0.911	0.918	0.926	0.933	0.941	0.948
1.40		0.784	0.791	0.797	0.803	0.810	0.816	0.823	0.830	0.836	0.843
1.50		0.702	0.708	0.714	0.720	0.725	0.731	0.737	0.743	0.748	0.754
1.60		0.632	0.637	0.643	0.649	0.653	0.659	0.664	0.669	0.674	0.679
1.70		0.571	0.576	0.581	0.585	0.591	0.596	0.601	0.606	0.611	0.165
1.80		0.518	0.523	0.528	0.534	0.537	0.542	0.547	0.551	0.555	0.560
1.90		0.472	0.477	0.481	0.485	0.490	0.495	0.499	0.503	0.507	0.511
2.00		0.432	0.436	0.440	0.443	0.449	0.453	0.457	0.461	0.465	0.469

Table 4.3.1.2. *Atomic scattering amplitudes (Å) for electrons for ionized atoms (cont.)*

$(\sin\theta)/\lambda$ ($Å^{-1}$)	Element	Ra^{2+}	Ac^{3+}	U^{3+}	U^{4+}	U^{6+}
	Z	88	89	92	92	92
	Method	*DS	*DS	*DS	*DS	*DS
0.00						
0.01						
0.02						
0.03						
0.04		40.04	54.00	54.02	68.15	96.83
0.05		29.19	37.78	37.81	46.56	64.49
0.06		23.23	28.91	28.95	34.80	46.89
0.07		19.57	23.53	23.57	27.67	36.26
0.08		17.14	19.98	20.03	23.01	29.33
0.09		15.42	17.51	17.57	19.78	24.56
0.10		14.12	15.70	15.76	17.44	21.12
0.11		13.11	14.31	14.39	15.67	18.55
0.12		12.291	13.217	13.300	14.296	16.573
0.13		11.602	12.324	12.416	13.192	15.010
0.14		11.008	11.577	11.679	12.287	13.749
0.15		10.486	10.939	11.050	11.528	12.709
0.16		10.018	10.382	10.503	10.879	11.837
0.17		9.592	9.889	10.018	10.314	11.093
0.18		9.200	9.446	9.583	9.816	10.451
0.19		8.836	9.042	9.188	9.371	9.889
0.20		8.495	8.671	8.824	8.967	9.391
0.22		7.873	8.008	8.174	8.261	8.544
0.24		7.315	7.427	7.602	7.655	7.843
0.25		7.057	7.161	7.340	7.380	7.534
0.26		6.811	6.909	7.091	7.122	7.247
0.28		6.355	6.444	6.629	6.647	6.729
0.30		5.940	6.022	6.208	6.219	6.273
0.32		5.563	5.639	5.824	5.830	5.865
0.34		5.219	5.291	5.472	5.475	5.497
0.35		5.059	5.128	5.307	5.309	5.327
0.36		4.906	4.973	5.149	5.151	5.164
0.38		4.621	4.683	4.853	4.853	4.861
0.40		4.360	4.417	4.580	4.580	4.584
0.42		4.122	4.174	4.329	4.328	4.330
0.44		3.904	3.951	4.098	4.097	4.096
0.45		3.801	3.847	3.989	3.988	3.987
0.46		3.703	3.747	3.885	3.883	3.881
0.48		3.518	3.558	3.688	3.686	3.683
0.50		3.348	3.385	3.506	3.504	3.500
0.55		2.975	3.005	3.107	3.106	3.100
0.60		2.664	2.689	2.776	2.774	2.768
0.65		2.400	2.421	2.496	2.494	2.489
0.70		2.174	2.193	2.258	2.256	2.252
0.80		1.808	1.824	1.875	1.874	1.872
0.90		1.527	1.541	1.583	1.582	1.582
1.00		1.307	1.319	1.354	1.354	1.354
1.10		1.132	1.142	1.171	1.172	1.172
1.20		0.991	0.999	1.024	1.025	1.025
1.30		0.874	0.882	0.904	0.904	0.905
1.40		0.778	0.784	0.804	0.804	0.804
1.50		0.696	0.702	0.720	0.720	0.720
1.60		0.626	0.632	0.648	0.648	0.648
1.70		0.566	0.571	0.586	0.586	0.586
1.80		0.513	0.518	0.533	0.533	0.533
1.90		0.467	0.472	0.486	0.486	0.486
2.00		0.427	0.431	0.444	0.444	0.444

Table 4.3.2.1. *Parameters useful in electron diffraction as a function of accelerating voltage, E*

E (keV)	λ	$1/\lambda$	m/m_0	v/c	σ
1	0.387629	2.57979	1.00196	0.06247	0.0081126
2	0.273961	3.65016	1.00391	0.08821	0.0057448
3	0.223579	4.47270	1.00587	0.10788	0.0046975
4	0.193530	5.16715	1.00783	0.12439	0.0040741
5	0.173015	5.77986	1.00978	0.13887	0.0036493
6	0.157863	6.33460	1.01174	0.15191	0.0033361
7	0.146082	6.84548	1.01370	0.16384	0.0030931
8	0.136581	7.32168	1.01566	0.17490	0.0028975
9	0.128707	7.76958	1.01761	0.18524	0.0027358
10	0.122043	8.19383	1.01957	0.19498	0.0025991
15	0.099407	10.05963	1.02935	0.23711	0.0021374
20	0.085882	11.64383	1.03914	0.27186	0.0018641
25	0.076632	13.04940	1.04892	0.30184	0.0016790
30	0.069789	14.32899	1.05871	0.32837	0.0015433
35	0.064459	15.51381	1.06849	0.35227	0.0014386
40	0.060153	16.62414	1.07828	0.37406	0.0013548
45	0.056580	17.67403	1.08806	0.39410	0.0012859
50	0.053551	18.67366	1.09784	0.41268	0.0012280
55	0.050941	19.63072	1.10763	0.43000	0.0011786
60	0.048659	20.55115	1.11741	0.44622	0.0011357
65	0.046642	21.43968	1.12720	0.46147	0.0010982
70	0.044843	22.30012	1.13698	0.47586	0.0010650
75	0.043223	23.13560	1.14677	0.48948	0.0010354
80	0.041756	23.94874	1.15655	0.50239	0.0010087
85	0.040418	24.74173	1.16634	0.51467	0.0009847
90	0.039190	25.51646	1.17612	0.52637	0.0009628
95	0.038060	26.27454	1.18591	0.53754	0.0009428
100	0.037013	27.01738	1.19569	0.54822	0.0009244
120	0.033491	29.85866	1.23483	0.58667	0.0008638
140	0.030739	32.53222	1.27397	0.61956	0.0008180
160	0.028509	35.07642	1.31310	0.64810	0.0007820
180	0.026654	37.51759	1.35224	0.67314	0.0007529
200	0.025079	39.87466	1.39138	0.69531	0.0007289
250	0.021986	45.48412	1.48922	0.74101	0.0006839
300	0.019687	50.79517	1.58707	0.77652	0.0006526
350	0.017891	55.89295	1.68491	0.80483	0.0006297
400	0.016439	60.83109	1.78276	0.82786	0.0006122
450	0.015233	65.64563	1.88060	0.84691	0.0005984
500	0.014212	70.36195	1.97845	0.86286	0.0005873
550	0.013334	74.99858	2.07629	0.87638	0.0005783
600	0.012568	79.56945	2.17414	0.88794	0.0005707
650	0.011893	84.08529	2.27198	0.89793	0.0005644
700	0.011292	88.55452	2.36983	0.90661	0.0005590
750	0.010755	92.98385	2.46767	0.91421	0.0005543
800	0.010269	97.37874	2.56552	0.92091	0.0005503
850	0.009829	101.74364	2.66336	0.92684	0.0005468
900	0.009427	106.08226	2.76121	0.93212	0.0005437
950	0.009058	110.39769	2.85905	0.93684	0.0005410
1000	0.008719	114.69256	2.95690	0.94108	0.0005385
1100	0.008115	123.22919	3.15259	0.94836	0.0005344
1200	0.007593	131.70646	3.34828	0.95436	0.0005310
1300	0.007136	140.13516	3.54397	0.95936	0.0005282
1400	0.006733	148.52355	3.73966	0.96358	0.0005259
1500	0.006374	156.87810	3.93535	0.96718	0.0005240

Table 4.3.2.2. *Elastic atomic scattering factors of electrons for neutral atoms and s up to 2.0 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	0.0349	0.1201	0.1970	0.0573	0.1195	0.5347	3.5867	12.3471	18.9525	38.6269
He	2	0.0317	0.0838	0.1526	0.1334	0.0164	0.2507	1.4751	4.4938	12.6646	31.1653
Li	3	0.0750	0.2249	0.5548	1.4954	0.9354	0.3864	2.9383	15.3829	53.5545	138.7337
Be	4	0.0780	0.2210	0.6740	1.3867	0.6925	0.3131	2.2381	10.1517	30.9061	78.3273
B	5	0.0909	0.2551	0.7738	1.2136	0.4606	0.2995	2.1155	8.3816	24.1292	63.1314
C	6	0.0893	0.2563	0.7570	1.0487	0.3575	0.2465	1.7100	6.4094	18.6113	50.2523
N	7	0.1022	0.3219	0.7982	0.8197	0.1715	0.2451	1.7481	6.1925	17.3894	48.1431
O	8	0.0974	0.2921	0.6910	0.6990	0.2039	0.2067	1.3815	4.6943	12.7105	32.4726
F	9	0.1083	0.3175	0.6487	0.5846	0.1421	0.2057	1.3439	4.2788	11.3932	28.7881
Ne	10	0.1269	0.3535	0.5582	0.4674	0.1460	0.2200	1.3779	4.0203	9.4934	23.1278
Na	11	0.2142	0.6853	0.7692	1.6589	1.4482	0.3334	2.3446	10.0830	48.3037	138.2700
Mg	12	0.2314	0.6866	0.9677	2.1882	1.1339	0.3278	2.2720	10.9241	39.2898	101.9748
Al	13	0.2390	0.6573	1.2011	2.5586	1.2312	0.3138	2.1063	10.4163	34.4552	98.5344
Si	14	0.2519	0.6372	1.3795	2.5082	1.0500	0.3075	2.0174	9.6746	29.3744	80.4732
P	15	0.2548	0.6106	1.4541	2.3204	0.8477	0.2908	1.8740	8.5176	24.3434	63.2996
S	16	0.2497	0.5628	1.3899	2.1865	0.7715	0.2681	1.6711	7.0267	19.5377	50.3888
Cl	17	0.2443	0.5397	1.3919	2.0197	0.6621	0.2468	1.5242	6.1537	16.6687	42.3086
Ar	18	0.2385	0.5017	1.3428	1.8899	0.6079	0.2289	1.3694	5.2561	14.0928	35.5361
K	19	0.4115	1.4031	2.2784	2.6742	2.2162	0.3703	3.3874	13.1029	68.9592	194.4329
Ca	20	0.4054	1.3880	2.1602	3.7532	2.2063	0.3499	3.0991	11.9608	53.9353	142.3892
Sc	21	0.3787	1.2181	2.0594	3.2618	2.3870	0.3133	2.5856	9.5813	41.7688	116.7282
Ti	22	0.3825	1.2598	2.0008	3.0617	2.0694	0.3040	2.4863	9.2783	39.0751	109.4583
V	23	0.3876	1.2750	1.9109	2.8314	1.8979	0.2967	2.3780	8.7981	35.9528	101.7201
Cr	24	0.4046	1.3696	1.8941	2.0800	1.2196	0.2986	2.3958	9.1406	37.4701	113.7121
Mn	25	0.3796	1.2094	1.7815	2.5420	1.5937	0.2699	2.0455	7.4726	31.0604	91.5622
Fe	26	0.3946	1.2725	1.7031	2.3140	1.4795	0.2717	2.0443	7.6007	29.9714	86.2265
Co	27	0.4118	1.3161	1.6493	2.1930	1.2830	0.2742	2.0372	7.7205	29.9680	84.9383
Ni	28	0.3860	1.1765	1.5451	2.0730	1.3814	0.2478	1.7660	6.3107	25.2204	74.3146
Cu	29	0.4314	1.3208	1.5236	1.4671	0.8562	0.2694	1.9223	7.3474	28.9892	90.6246
Zn	30	0.4288	1.2646	1.4472	1.8294	1.0934	0.2593	1.7998	6.7500	25.5860	73.5284
Ga	31	0.4818	1.4032	1.6561	2.4605	1.1054	0.2825	1.9785	8.7546	32.5238	98.5523
Ge	32	0.4655	1.3014	1.6088	2.6998	1.3003	0.2647	1.7926	7.6071	26.5541	77.5238
As	33	0.4517	1.2229	1.5852	2.7958	1.2638	0.2493	1.6436	6.8154	22.3681	62.0390
Se	34	0.4477	1.1678	1.5843	2.8087	1.1956	0.2405	1.5442	6.3231	19.4610	52.0233
Br	35	0.4798	1.1948	1.8695	2.6953	0.8203	0.2504	1.5963	6.9653	19.8492	50.3233
Kr	36	0.4546	1.0993	1.7696	2.7068	0.8672	0.2309	1.4279	5.9449	16.6752	42.2243
Rb	37	1.0160	2.8528	3.5466	-7.7804	12.1148	0.4853	5.0925	25.7851	130.4515	138.6775
Sr	38	0.6703	1.4926	3.3368	4.4600	3.1501	0.3190	2.2287	10.3504	52.3291	151.2216
Y	39	0.6894	1.5474	3.2450	4.2126	2.9764	0.3189	2.2904	10.0062	44.0771	125.0120
Zr	40	0.6719	1.4684	3.1668	3.9557	2.8920	0.3036	2.1249	8.9236	36.8458	108.2049
Nb	41	0.6123	1.2677	3.0348	3.3841	2.3683	0.2709	1.7683	7.2489	27.9465	98.5624
Mo	42	0.6773	1.4798	3.1788	3.0824	1.8384	0.2920	2.0606	8.1129	30.5336	100.0658
Tc	43	0.7082	1.6392	3.1993	3.4327	1.8711	0.2976	2.2106	8.5246	33.1456	96.6377
Ru	44	0.6735	1.4934	3.0966	2.7254	1.5597	0.2773	1.9716	7.3249	26.6891	90.5581
Rh	45	0.6413	1.3690	2.9854	2.6952	1.5433	0.2580	1.7721	6.3854	23.2549	85.1517
Pd	46	0.5904	1.1775	2.6519	2.2875	0.8689	0.2324	1.5019	5.1591	15.5428	46.8213
Ag	47	0.6377	1.3790	2.8294	2.3631	1.4553	0.2466	1.6974	5.7656	20.0943	76.7372
Cd	48	0.6364	1.4247	2.7802	2.5973	1.7886	0.2407	1.6823	5.6588	20.7219	69.1109
In	49	0.6768	1.6589	2.7740	3.1835	2.1326	0.2522	1.8545	6.2936	25.1457	84.5448

Table 4.3.2.2. *Elastic atomic scattering factors of electrons for neutral atoms and s up to 2.0 Å^{-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	0.7224	1.9610	2.7161	3.5603	1.8972	0.2651	2.0604	7.3011	27.5493	81.3349
Sb	51	0.7106	1.9247	2.6149	3.8322	1.8899	0.2562	1.9646	6.8852	24.7648	68.9168
Te	52	0.6947	1.8690	2.5356	4.0013	1.8955	0.2459	1.8542	6.4411	22.1730	59.2206
I	53	0.7047	1.9484	2.5940	4.1526	1.5057	0.2455	1.8638	6.7639	21.8007	56.4395
Xe	54	0.6737	1.7908	2.4129	4.2100	1.7058	0.2305	1.6890	5.8218	18.3928	47.2496
Cs	55	1.2704	3.8018	5.6618	0.9205	4.8105	0.4356	4.2058	23.4342	136.7783	171.7561
Ba	56	0.9049	2.6076	4.8498	5.1603	4.7388	0.3066	2.4363	12.1821	54.6135	161.9978
La	57	0.8405	2.3863	4.6139	5.1514	4.7949	0.2791	2.1410	10.3400	41.9148	132.0204
Ce	58	0.8551	2.3915	4.5772	5.0278	4.5118	0.2805	2.1200	10.1808	42.0633	130.9893
Pr	59	0.9096	2.5313	4.5266	4.6376	4.3690	0.2939	2.2471	10.8266	48.8842	147.6020
Nd	60	0.8807	2.4183	4.4448	4.6858	4.1725	0.2802	2.0836	10.0357	47.4506	146.9976
Pm	61	0.9471	2.5463	4.3523	4.4789	3.9080	0.2977	2.2276	10.5762	49.3619	145.3580
Sm	62	0.9699	2.5837	4.2778	4.4575	3.5985	0.3003	2.2447	10.6487	50.7994	146.4179
Eu	63	0.8694	2.2413	3.9196	3.9694	4.5498	0.2653	1.8590	8.3998	36.7397	125.7089
Gd	64	0.9673	2.4702	4.1148	4.4972	3.2099	0.2909	2.1014	9.7067	43.4270	125.9474
Tb	65	0.9325	2.3673	3.8791	3.9674	3.7996	0.2761	1.9511	8.9296	41.5937	131.0122
Dy	66	0.9505	2.3705	3.8218	4.0471	3.4451	0.2773	1.9469	8.8862	43.0938	133.1396
Ho	67	0.9248	2.2428	3.6182	3.7910	3.7912	0.2660	1.8183	7.9655	33.1129	101.8139
Er	68	1.0373	2.4824	3.6558	3.8925	3.0056	0.2944	2.0797	9.4156	45.8056	132.7720
Tm	69	1.0075	2.3787	3.5440	3.6932	3.1759	0.2816	1.9486	8.7162	41.8420	125.0320
Yb	70	1.0347	2.3911	3.4619	3.6556	3.0052	0.2855	1.9679	8.7619	42.3304	125.6499
Lu	71	0.9927	2.2436	3.3554	3.7813	3.0994	0.2701	1.8073	7.8112	34.4849	103.3526
Hf	72	1.0295	2.2911	3.4110	3.9497	2.4925	0.2761	1.8625	8.0961	34.2712	98.5295
Ta	73	1.0190	2.2291	3.4097	3.9252	2.2679	0.2694	1.7962	7.6944	31.0942	91.1089
W	74	0.9853	2.1167	3.3570	3.7981	2.2798	0.2569	1.6745	7.0098	26.9234	81.3910
Re	75	0.9914	2.0858	3.4531	3.8812	1.8526	0.2548	1.6518	6.8845	26.7234	81.7215
Os	76	0.9813	2.0322	3.3665	3.6235	1.9741	0.2487	1.5973	6.4737	23.2817	70.9254
Ir	77	1.0194	2.0645	3.4425	3.4914	1.6976	0.2554	1.6475	6.5966	23.2269	70.0272
Pt	78	0.9148	1.8096	3.2134	3.2953	1.5754	0.2263	1.3813	5.3243	17.5987	60.0171
Au	79	0.9674	1.8916	3.3993	3.0524	1.2607	0.2358	1.4712	5.6758	18.7119	61.5286
Hg	80	1.0033	1.9469	3.4396	3.1548	1.4180	0.2413	1.5298	5.8009	19.4520	60.5753
Tl	81	1.0689	2.1038	3.6039	3.4927	1.8283	0.2540	1.6715	6.3509	23.1531	78.7099
Pb	82	1.0891	2.1867	3.6160	3.8031	1.8994	0.2552	1.7174	6.5131	23.9170	74.7039
Bi	83	1.1007	2.2306	3.5689	4.1549	2.0382	0.2546	1.7351	6.4948	23.6464	70.3780
Po	84	1.1568	2.4353	3.6459	4.4064	1.7179	0.2648	1.8786	7.1749	25.1766	69.2821
At	85	1.0909	2.1976	3.3831	4.6700	2.1277	0.2466	1.6707	6.0197	20.7657	57.2663
Rn	86	1.0756	2.1630	3.3178	4.8852	2.0489	0.2402	1.6169	5.7644	19.4568	52.5009
Fr	87	1.4282	3.5081	5.6767	4.1964	3.8946	0.3183	2.6889	13.4816	54.3866	200.8321
Ra	88	1.3127	3.1243	5.2988	5.3891	5.4133	0.2887	2.2897	10.8276	43.5389	145.6109
Ac	89	1.3128	3.1021	5.3385	5.9611	4.7562	0.2861	2.2509	10.5287	41.7796	128.2973
Th	90	1.2553	2.9178	5.0862	6.1206	4.7122	0.2701	2.0636	9.3051	34.5977	107.9200
Pa	91	1.3218	3.1444	5.4371	5.6444	4.0107	0.2827	2.2250	10.2454	41.1162	124.4449
U	92	1.3382	3.2043	5.4558	5.4839	3.6342	0.2838	2.2452	10.2519	41.7251	124.9023
Np	93	1.5193	4.0053	6.5327	-.1402	6.7489	0.3213	2.8206	14.8878	68.9103	81.7257
Pu	94	1.3517	3.2937	5.3213	4.6466	3.5714	0.2813	2.2418	9.9952	42.7939	132.1739
Am	95	1.2135	2.7962	4.7545	4.5731	4.4786	0.2483	1.8437	7.5421	29.3841	112.4579
Cm	96	1.2937	3.1100	5.0393	4.7546	3.5031	0.2638	2.0341	8.7101	35.2992	109.4972
Bk	97	1.2915	3.1023	4.9309	4.6009	3.4661	0.2611	2.0023	8.4377	34.1559	105.8911
Cf	98	1.2089	2.7391	4.3482	4.0047	4.6497	0.2421	1.7487	6.7262	23.2153	80.3108

Table 4.3.2.3. *Elastic atomic scattering factors of electrons for neutral atoms and s up to 6.0 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

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