ISTITUTO NAZIONALE DI FISICA NUCLEARE

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5 Gennaio 1981

P. Boccaccio and G. Viesti

TABULATION OF HEAVY-ION STOPPING POWERS FOR GAS DETECTORS.

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ABSTRACT.

A tabulation of heavy-ion stopping powers is presented for projectiles from He to U in materials normally used in gas-detector systems. The basic Bethe-Bloch theory, incorporating corrections for the projectile low-velocity effect and charge state, is employed. Results are compared with some experimental data sets and with Northcliffe and Schilling's evaluations.

1. - INTRODUCTION.

Gas filled detectors are of common use in heavy-ion experiments. Ionization chambers, proportional counters, parallel-plate avalanche counters can be made by standard techniques in a large variety of geometrical arrangements.

It's often necessary, in gas-detector design and operation, to estimate the energy lost by heavy ions in traversing the vindow material and the gas. Optimal operation can be achieved for each experimental condition, provided that energy losses are correctly estimated.

Scarce experimentally based heavy-ion stopping powers are available presently, for gases and window materials employed in such detectors: only in Northcliffe and Schilling's evaluations[1] data are reported on Argon, Mylar and Polyethylene.

The present paper reports an investigation on the electronic stopping power for projectiles from He to U on a number of composite materials and gases. The basic Bethe-Bloch (B.B.) theory, incorporating corrections for the projectile low-velocity effect and charge state is employed.

This analytical approach is known to give estimates which are generally in good agreement with experimental data if some quantities included in the formalism can be extracted from light-ion experimental stopping powers or extrapolated from the analysis of heavy-ion stopping powers in neighbouring elements. In Section 2 the calculation procedure is summarized. Detailed information on the materials and on the parameters used is given in Section 3; the results are discussed in Section 4.

2. - CALCULATION DETAILS.

The Bethe-Bloch theory incorporating corrections for the projectile low-velocity effect and charge state was employed. The computer code ELOSS and the method used for the heavy-ion stopping-power calculation are extensively described in Ref. (2). For the present calculation only three parameters have to be determined: the mean ionization potential I and the K-shell correction parameter B_1, which are characteristic of the stopping material, and the effective-charge parameter λ which is related to the projectile-target combination.

The parameter evaluation can be summarized as follows:

a) I and B_1 were extracted by fitting to light-ion stopping powers whenever available. In lack of experimental data, Bragg's additivity rule was employed using I-values for elemental targets from Ref. (3) and averaged B_1-values.
Chemical-binding effects are likely to cause departures from Bragg's rule, especially at lower velocities, thus increasing the uncertainties of the calculated stopping powers[4]. However for some applications in which calculated stopping powers can be considered as a guide for the laboratory practice, one can neglect the effect of chemical binding and use both experimentally - and additivity rule - based stopping powers for all the compounds with the same chemical formula.

b) As shown in previous analysis[3], the effective-charge parameter λ for different Z_1 projectiles on a light ($1 \leq Z_2 \leq 8$) target, can be expressed as:

$$\lambda(Z_1) = A + B/Z_1 .$$

A, B being specific constants for each absorber. Moreover the dependence of A and B, as a function of Z_2, exhibits simple patterns, thus allowing extrapolation procedures in the (Z_1, Z_2) space.
It is thus possible to obtain interpolated λ-values from a trend analysis and predict with reasonable accuracy the ion effective charge also in lack of experimental information.

3. - MATERIALS.

3.1. - Windows.

a) Polyethylene $(CH_2)_n$. Experimental data on ^{12}C and ^{16}O in polyethylene are available[5]. The I- and B_1-values, extracted from fits to experiments were used; λ from trend analysis. In the respect of Bragg's rule Polypropylene has the same composition.

b) Polyvinyl formal resin FORMVAR: empirical formula $C_{11}H_{18}O_5$. No experimental data were found.

c) Polyester film MYLAR (Du Pont), MELINEX (I. C. I.), HOSTAPHAN (Hoechst): empirical formula $C_{10}H_8O_4$.
Experimental data on α[6], ^{12}C, ^{16}O, ^{20}Ne[5], ^{32}S, ^{35}Cl, ^{53}Br, ^{127}I[7] in Mylar are available allowing the determination of all the calculation parameters.

d) Polyvinylchlorideacetate copolymer VYNS (Union Carbide) : empirical formula CH_2CHCl (90 %) + $CH_2CHO_2CCH_3$ (10 %).
No experimental data were found.

e) Cobalt-base alloy HAVAR (Hamilton Watch Company).
Experimental data on α and d[6] and α and p[8] are available. I and B_1 have been extracted from fits to these data. The average Z of Havar is ~27 and the corresponding value for $\lambda(Z_1)$ was estimated to be the same as for Nickel for which a number of heavy-ion stopping-power data are available. In Fig. 1 is displayed the dependence of λ vs. Z_1 for Nickel, as determined by fitting to experimental data relative to Br, I[9], O, Cl[10]; F, Mg, Al, S, Cl[11] in Nickel.

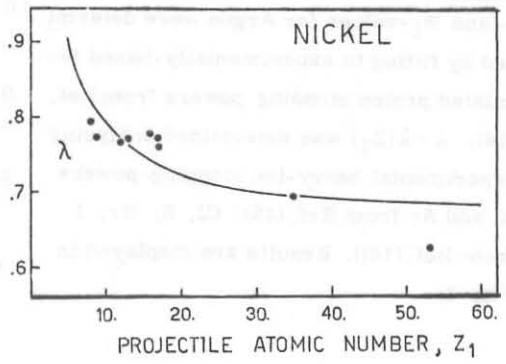

FIG. 1 - Effective charge parameter λ as a function of projectile atomic number Z_1 for Nickel.

3.2. - Gas.

a) Hydrocarbons.
Experimental data on p and α stopping powers on several hydrocarbons were analyzed by L. E. Porter and L. C. Shepard in the frame of the Bethe-Bloch formalism[12]. Values for I and B_1 tabulated in that work for methane, butane, ethylene, propylene and butene, were employed in the present calculation. As a check we have compared the calculated α stopping-powers in n-Butane with experimental data by A. S. Lodhi and D. Powers[4] and F. Wenger and coworkers[13], not considered in Porter's analysis. The resulting agreement is fully satisfactory, as displayed in Fig. 2.

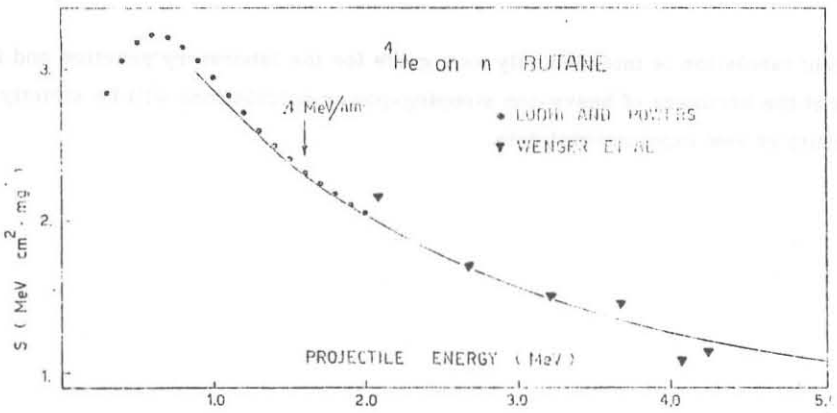

FIG. 2 - Comparison of calculated stopping powers with experimental data from Refs. (4, 13).

The λ-values used in generating heavy-ion stopping powers are based on the described trend analysis. Also in the case of hydrocarbons apply the considerations made in the previous section on the influence of chemical and molecular binding effect on stopping power.

b) Argon.

I- and B_1-values for Argon were determined by fitting to experimentally-based tabulated proton stopping powers from Ref. (14). $\lambda = \lambda(Z_1)$ was determined analyzing experimental heavy-ion stopping powers (C and Ar from Ref. (15); Cl, S, Br, I from Ref. (16)). Results are displayed in Fig. 3.

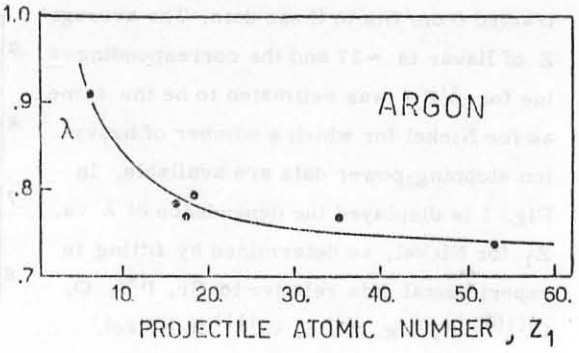

FIG. 3 - Effective charge parameter λ as a function of projectile atomic number Z_1 for Argon.

4. - RESULTS AND DISCUSSION.

Using the values for I, B_1 and λ determined as discussed in the previous section, heavy-ion stopping powers were calculated in the energy range 0.4-100 MeV/amu for projectiles ranging from ^{12}C to ^{238}U. A compilation of α-stopping powers was also included because of the large use of radioactive α-sources for off-beam thickness measurements.

As a test of the calculation, in Figs. 4 and 5, results are compared with experimental data on Mylar and Argon and with Northcliffe and Schilling's tabulations. A fairly good agreement with both experimental and N. S. 's values was obtained.

A crucial point is the estimate of the uncertainties in predicting stopping powers. The expected accuracy is likely to be ~10 - 20% depending on the parameter determination uncertainties.

The present tabulation is intended only as a guide for the laboratory practice and further developments of the accuracy of heavy-ion stopping-power calculations will be strictly related to the availability of new experimental data.

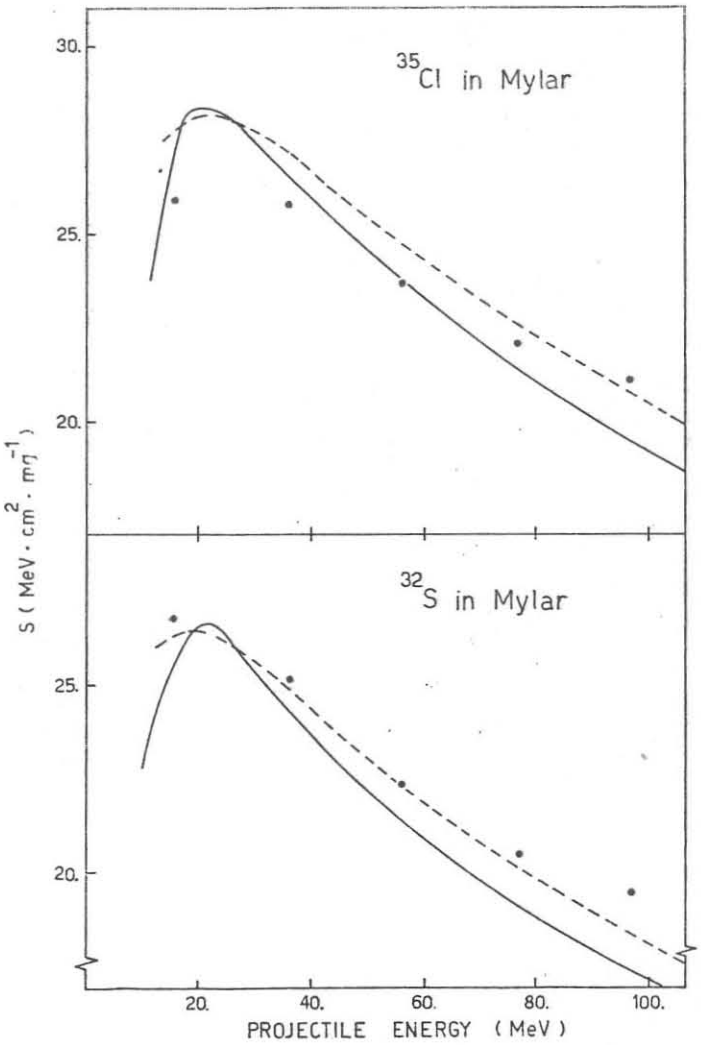

FIG. 4 - Comparison of calculated stopping powers with experimental data from Ref. (7). Solid curves refer to N. S. [1], dashed curves to the present tabulation.

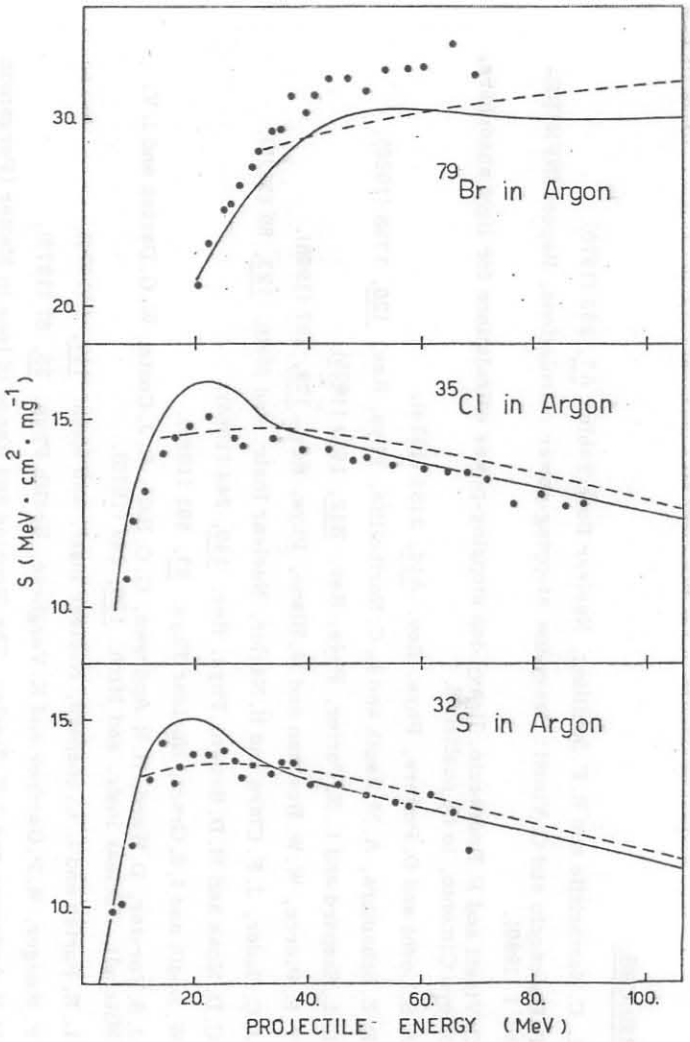

FIG. 5 - Comparison of calculated stopping powers with experimental data from Ref. (16). Solid curves refer to N. S. [1], dashed curves to the present tabulation.

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$^{4}_{2}He$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	2.096	1.793	1.705	1.453	.872	1.048
.60	1.668	1.443	1.365	1.188	.706	.821
.80	1.385	1.209	1.142	1.006	.601	.692
1.00	1.187	1.043	.986	.875	.527	.605
1.20	1.042	.919	.870	.777	.473	.541
1.40	.931	.823	.780	.700	.430	.491
1.60	.843	.747	.709	.638	.395	.451
1.80	.771	.685	.650	.587	.367	.418
2.00	.712	.633	.601	.544	.343	.390
3.00	.521	.465	.442	.404	.262	.296
4.00	.415	.372	.354	.325	.215	.242
5.00	.347	.312	.297	.274	.184	.206
6.00	.300	.270	.257	.237	.161	.180
7.00	.264	.238	.227	.210	.144	.160
8.00	.237	.214	.204	.189	.131	.144
9.00	.215	.194	.185	.172	.120	.132
10.00	.197	.178	.170	.158	.110	.121
20.00	.110	.100	.096	.090	.065	.071
40.00	.061	.056	.053	.050	.037	.040
60.00	.043	.039	.038	.036	.027	.029
80.00	.034	.031	.029	.028	.021	.022
100.00	.028	.025	.024	.023	.017	.019

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	2.679	2.308	2.276	2.263	2.229	2.270
.60	2.078	1.814	1.786	1.778	1.755	1.780
.80	1.702	1.495	1.472	1.466	1.448	1.466
1.00	1.447	1.276	1.255	1.250	1.236	1.250
1.20	1.263	1.117	1.098	1.094	1.082	1.093
1.40	1.123	.995	.978	.975	.965	.974
1.60	1.014	.900	.884	.881	.872	.880
1.80	.926	.823	.808	.805	.797	.803
2.00	.853	.759	.745	.742	.735	.741
3.00	.619	.553	.543	.541	.536	.539
4.00	.490	.440	.431	.430	.427	.429
5.00	.409	.367	.360	.359	.356	.357
6.00	.352	.316	.310	.309	.307	.308
7.00	.310	.279	.273	.273	.271	.271
8.00	.277	.250	.245	.244	.242	.243
9.00	.251	.227	.222	.221	.220	.220
10.00	.230	.208	.203	.203	.202	.202
20.00	.128	.116	.113	.113	.113	.113
40.00	.070	.064	.063	.062	.062	.062
60.00	.049	.045	.044	.044	.044	.044
80.00	.038	.035	.034	.034	.034	.034
100.00	.032	.029	.028	.028	.028	.028

$^{12}_{6}C$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	13.189	9.624	9.223	7.555	3.979	4.993
.60	11.683	8.903	8.481	7.147	3.806	4.595
.80	10.340	8.139	7.749	6.641	3.614	4.298
1.00	9.241	7.450	7.099	6.157	3.426	4.044
1.20	8.353	6.850	6.535	5.720	3.251	3.818
1.40	7.625	6.333	6.048	5.332	3.090	3.614
1.60	7.020	5.887	5.626	4.989	2.943	3.430
1.80	6.511	5.501	5.259	4.686	2.809	3.263
2.00	6.077	5.165	4.937	4.417	2.686	3.110
3.00	4.593	3.985	3.796	3.441	2.203	2.517
4.00	3.704	3.265	3.107	2.834	1.870	2.114
5.00	3.109	2.771	2.640	2.421	1.627	1.823
6.00	2.694	2.408	2.299	2.117	1.442	1.605
7.00	2.377	2.133	2.037	1.883	1.296	1.435
8.00	2.133	1.920	1.831	1.697	1.178	1.298
9.00	1.937	1.747	1.666	1.546	1.080	1.186
10.00	1.776	1.604	1.531	1.422	.998	1.093
20.00	.994	.904	.863	.808	.585	.637
40.00	.550	.502	.480	.452	.336	.362
60.00	.387	.354	.339	.320	.240	.258
80.00	.302	.276	.264	.250	.189	.202
100.00	.248	.228	.218	.207	.157	.168

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	18.252	14.994	14.322	14.244	14.027	14.063
.60	15.429	13.006	12.507	12.449	12.286	12.312
.80	13.295	11.372	10.988	10.942	10.811	10.841
1.00	11.680	10.089	9.774	9.736	9.627	9.657
1.20	10.436	9.068	8.804	8.771	8.678	8.705
1.40	9.451	8.245	8.017	7.988	7.906	7.933
1.60	8.653	7.570	7.366	7.340	7.268	7.291
1.80	7.990	7.006	6.821	6.797	6.732	6.754
2.00	7.428	6.527	6.357	6.336	6.277	6.296
3.00	5.508	4.899	4.784	4.770	4.729	4.743
4.00	4.392	3.928	3.848	3.837	3.806	3.819
5.00	3.674	3.293	3.224	3.215	3.190	3.201
6.00	3.168	2.845	2.790	2.782	2.762	2.768
7.00	2.790	2.510	2.459	2.453	2.435	2.442
8.00	2.498	2.250	2.205	2.199	2.184	2.189
9.00	2.264	2.042	2.001	1.996	1.982	1.986
10.00	2.073	1.871	1.833	1.829	1.816	1.820
20.00	1.152	1.044	1.022	1.020	1.014	1.015
40.00	.634	.576	.564	.563	.560	.560
60.00	.445	.405	.397	.396	.394	.394
80.00	.346	.316	.309	.308	.307	.306
100.00	.285	.260	.254	.254	.252	.252

$^{14}_{7}N$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	15.581	11.396	11.050	9.037	4.695	5.936
.60	14.164	10.771	10.367	8.716	4.574	5.564
.80	12.767	10.004	9.613	8.217	4.404	5.277
1.00	11.568	9.268	8.907	7.705	4.223	5.021
1.20	10.569	8.606	8.275	7.223	4.045	4.784
1.40	9.734	8.021	7.715	6.784	3.876	4.565
1.60	9.028	7.508	7.223	6.388	3.717	4.362
1.80	8.426	7.058	6.787	6.033	3.569	4.174
2.00	7.907	6.661	6.402	5.714	3.431	3.999
3.00	6.090	5.235	5.006	4.526	2.871	3.297
4.00	4.959	4.339	4.138	3.767	2.467	2.800
5.00	4.185	3.709	3.540	3.240	2.164	2.433
6.00	3.640	3.237	3.096	2.847	1.928	2.152
7.00	3.219	2.877	2.751	2.541	1.740	1.930
8.00	2.893	2.596	2.478	2.294	1.586	1.751
9.00	2.630	2.365	2.257	2.093	1.458	1.603
10.00	2.413	2.174	2.077	1.927	1.350	1.479
20.00	1.353	1.230	1.175	1.100	.796	.867
40.00	.748	.683	.653	.615	.457	.492
60.00	.527	.482	.461	.436	.327	.351
80.00	.411	.376	.360	.341	.257	.275
100.00	.338	.310	.297	.281	.214	.228

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	21.624	17.728	16.920	16.828	16.572	16.610
.60	18.792	15.793	15.164	15.093	14.895	14.918
.80	16.505	14.068	13.567	13.509	13.348	13.373
1.00	14.709	12.656	12.235	12.186	12.050	12.076
1.20	13.290	11.501	11.141	11.099	10.981	11.004
1.40	12.147	10.551	10.234	10.197	10.093	10.116
1.60	11.205	9.759	9.473	9.440	9.347	9.367
1.80	10.413	9.090	8.827	8.797	8.713	8.730
2.00	9.734	8.516	8.273	8.245	8.169	8.183
3.00	7.343	6.510	6.343	6.324	6.270	6.282
4.00	5.903	5.268	5.152	5.137	5.096	5.110
5.00	4.962	4.440	4.340	4.328	4.295	4.307
6.00	4.291	3.849	3.770	3.760	3.732	3.739
7.00	3.786	3.403	3.331	3.322	3.298	3.306
8.00	3.393	3.054	2.991	2.983	2.962	2.968
9.00	3.078	2.774	2.717	2.710	2.691	2.697
10.00	2.820	2.543	2.491	2.485	2.468	2.473
20.00	1.568	1.421	1.392	1.389	1.380	1.381
40.00	.862	.784	.768	.766	.762	.762
60.00	.606	.552	.540	.539	.536	.536
80.00	.471	.429	.420	.420	.418	.417
100.00	.388	.353	.346	.345	.344	.343

$^{16}_{8}O$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	17.783	13.090	12.834	10.485	5.388	6.856
.60	16.506	12.587	12.237	10.272	5.325	6.520
.80	15.104	11.841	11.483	9.798	5.185	6.254
1.00	13.846	11.081	10.741	9.273	5.017	6.005
1.20	12.771	10.373	10.055	8.759	4.844	5.766
1.40	11.854	9.736	9.436	8.280	4.672	5.539
1.60	11.069	9.167	8.882	7.840	4.507	5.322
1.80	10.392	8.662	8.387	7.439	4.350	5.118
2.00	9.803	8.214	7.944	7.075	4.202	4.926
3.00	7.692	6.568	6.307	5.691	3.577	4.129
4.00	6.331	5.505	5.267	4.784	3.109	3.543
5.00	5.378	4.741	4.537	4.144	2.749	3.101
6.00	4.700	4.159	3.986	3.660	2.464	2.757
7.00	4.169	3.709	3.554	3.278	2.233	2.483
8.00	3.754	3.357	3.208	2.967	2.043	2.259
9.00	3.418	3.064	2.928	2.712	1.883	2.073
10.00	3.140	2.822	2.699	2.501	1.746	1.916
20.00	1.766	1.605	1.533	1.436	1.038	1.131
40.00	.977	.892	.853	.804	.597	.643
60.00	.689	.630	.603	.569	.427	.458
80.00	.536	.491	.470	.445	.335	.360
100.00	.442	.405	.388	.367	.280	.298

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	24.660	20.224	19.310	19.206	18.913	18.964
.60	21.923	18.410	17.671	17.568	17.358	17.385
.80	19.569	16.655	16.051	15.982	15.792	15.818
1.00	17.657	15.163	14.645	14.587	14.424	14.449
1.20	16.115	13.914	13.461	13.410	13.268	13.290
1.40	14.854	12.868	12.464	12.418	12.292	12.312
1.60	13.802	11.985	11.614	11.574	11.460	11.477
1.80	12.907	11.230	10.887	10.850	10.746	10.759
2.00	12.130	10.576	10.256	10.222	10.127	10.137
3.00	9.318	8.237	8.012	7.988	7.920	7.927
4.00	7.565	6.734	6.577	6.558	6.506	6.519
5.00	6.398	5.712	5.577	5.562	5.519	5.531
6.00	5.554	4.973	4.867	4.854	4.818	4.824
7.00	4.914	4.410	4.313	4.302	4.271	4.278
8.00	4.412	3.966	3.881	3.871	3.844	3.851
9.00	4.007	3.607	3.531	3.522	3.498	3.504
10.00	3.674	3.311	3.241	3.234	3.212	3.217
20.00	2.048	1.855	1.817	1.813	1.802	1.804
40.00	1.127	1.024	1.003	1.001	.995	.995
60.00	.791	.721	.706	.704	.701	.700
80.00	.615	.561	.549	.548	.545	.545
100.00	.506	.462	.452	.451	.449	.448

$^{19}_{9}F$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	19.828	14.721	14.580	11.903	6.062	7.757
.60	18.720	14.353	14.085	11.811	6.062	7.465
.80	17.346	13.645	13.349	11.376	5.956	7.226
1.00	16.059	12.877	12.586	10.850	5.808	6.991
1.20	14.932	12.139	11.860	10.316	5.643	6.757
1.40	13.956	11.460	11.191	9.804	5.474	6.526
1.60	13.109	10.846	10.584	9.327	5.307	6.302
1.80	12.373	10.295	10.035	8.887	5.145	6.087
2.00	11.727	9.801	9.541	8.483	4.989	5.881
3.00	9.365	7.961	7.682	6.919	4.313	5.002
4.00	7.791	6.745	6.476	5.872	3.788	4.335
5.00	6.664	5.851	5.616	5.121	3.374	3.820
6.00	5.855	5.159	4.959	4.547	3.041	3.413
7.00	5.211	4.618	4.437	4.087	2.768	3.085
8.00	4.706	4.194	4.015	3.710	2.540	2.816
9.00	4.293	3.837	3.672	3.398	2.348	2.590
10.00	3.950	3.540	3.391	3.139	2.183	2.398
20.00	2.234	2.028	1.938	1.814	1.310	1.428
40.00	1.237	1.129	1.080	1.018	.756	.814
60.00	.872	.797	.763	.721	.541	.580
80.00	.679	.622	.595	.563	.424	.456
100.00	.559	.513	.491	.465	.354	.377

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	27.420	22.523	21.531	21.415	21.089	21.160
.60	24.834	20.868	20.041	19.948	19.687	19.724
.80	22.470	19.125	18.433	18.355	18.136	18.169
1.00	20.493	17.589	16.985	16.918	16.729	16.759
1.20	18.868	16.275	15.740	15.680	15.514	15.537
1.40	17.523	15.159	14.674	14.620	14.471	14.492
1.60	16.389	14.206	13.756	13.707	13.573	13.588
1.80	15.414	13.384	12.962	12.918	12.794	12.805
2.00	14.560	12.667	12.269	12.228	12.114	12.121
3.00	11.386	10.043	9.755	9.725	9.642	9.645
4.00	9.339	8.297	8.094	8.071	8.006	8.019
5.00	7.954	7.087	6.911	6.892	6.839	6.850
6.00	6.937	6.201	6.063	6.047	6.003	6.006
7.00	6.158	5.518	5.392	5.378	5.339	5.346
8.00	5.542	4.976	4.865	4.852	4.818	4.825
9.00	5.042	4.534	4.435	4.424	4.394	4.400
10.00	4.629	4.168	4.078	4.068	4.040	4.046
20.00	2.591	2.347	2.298	2.293	2.279	2.281
40.00	1.426	1.296	1.269	1.267	1.260	1.260
60.00	1.002	.912	.893	.891	.887	.886
80.00	.779	.710	.695	.694	.690	.690
100.00	.641	.584	.572	.571	.568	.567

$^{20}_{10}Ne$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	21.748	16.299	16.292	13.295	6.722	8.642
.60	20.823	16.076	15.912	13.333	6.785	8.397
.80	19.498	15.417	15.207	12.947	6.718	8.191
1.00	18.203	14.652	14.434	12.430	6.592	7.976
1.20	17.043	13.894	13.678	11.883	6.440	7.751
1.40	16.025	13.183	12.968	11.347	6.277	7.522
1.60	15.131	12.532	12.315	10.839	6.112	7.294
1.80	14.348	11.943	11.720	10.365	5.948	7.072
2.00	13.657	11.411	11.178	9.926	5.787	6.856
3.00	11.085	9.399	9.114	8.197	5.071	5.908
4.00	9.318	8.042	7.752	7.018	4.495	5.165
5.00	8.026	7.026	6.767	6.161	4.032	4.580
6.00	7.089	6.226	6.004	5.497	3.653	4.113
7.00	6.334	5.596	5.391	4.959	3.339	3.732
8.00	5.737	5.098	4.891	4.514	3.074	3.416
9.00	5.246	4.676	4.483	4.144	2.849	3.150
10.00	4.835	4.322	4.147	3.835	2.655	2.922
20.00	2.753	2.497	2.388	2.235	1.610	1.757
40.00	1.527	1.394	1.333	1.256	.933	1.005
60.00	1.076	.984	.942	.890	.668	.717
80.00	.838	.768	.735	.696	.524	.562
100.00	.690	.633	.606	.574	.437	.466

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	29.955	24.665	23.616	23.488	23.130	23.228
.60	27.552	23.168	22.293	22.189	21.898	21.953
.80	25.216	21.483	20.720	20.632	20.386	20.432
1.00	23.207	19.929	19.253	19.176	18.962	19.001
1.20	21.531	18.573	17.965	17.897	17.707	17.737
1.40	20.128	17.406	16.848	16.787	16.616	16.641
1.60	18.936	16.401	15.877	15.821	15.666	15.684
1.80	17.902	15.528	15.031	14.980	14.837	14.848
2.00	16.990	14.760	14.288	14.240	14.108	14.112
3.00	13.510	11.898	11.546	11.511	11.413	11.412
4.00	11.196	9.931	9.680	9.653	9.575	9.587
5.00	9.604	8.544	8.323	8.300	8.236	8.246
6.00	8.419	7.514	7.342	7.323	7.268	7.269
7.00	7.502	6.712	6.553	6.536	6.489	6.495
8.00	6.770	6.071	5.930	5.916	5.874	5.880
9.00	6.173	5.544	5.419	5.406	5.369	5.374
10.00	5.676	5.105	4.992	4.980	4.946	4.951
20.00	3.195	2.893	2.833	2.827	2.810	2.811
40.00	1.761	1.600	1.567	1.564	1.555	1.555
60.00	1.237	1.126	1.103	1.101	1.095	1.094
80.00	.962	.877	.858	.857	.852	.851
100.00	.791	.722	.706	.705	.702	.701

$^{23}_{11}Na$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	23.566	17.832	17.974	14.663	7.368	9.513
.60	22.830	17.759	17.718	14.837	7.498	9.318
.80	21.568	17.158	17.054	14.509	7.470	9.150
1.00	20.279	16.405	16.281	14.008	7.370	8.958
1.20	19.101	15.635	15.502	13.455	7.234	8.746
1.40	18.053	14.900	14.759	12.901	7.080	8.523
1.60	17.124	14.219	14.067	12.368	6.919	8.296
1.80	16.306	13.597	13.429	11.864	6.755	8.069
2.00	15.578	13.031	12.846	11.394	6.593	7.846
3.00	12.834	10.870	10.593	9.514	5.846	6.840
4.00	10.893	9.386	9.084	8.211	5.226	6.027
5.00	9.446	8.254	7.979	7.254	4.717	5.377
6.00	8.389	7.350	7.113	6.503	4.295	4.850
7.00	7.524	6.631	6.408	5.888	3.941	4.416
8.00	6.837	6.062	5.829	5.375	3.640	4.054
9.00	6.268	5.573	5.356	4.945	3.382	3.747
10.00	5.789	5.163	4.964	4.585	3.158	3.484
20.00	3.324	3.011	2.882	2.695	1.936	2.117
40.00	1.848	1.686	1.613	1.519	1.128	1.215
60.00	1.302	1.191	1.140	1.077	.808	.867
80.00	1.014	.929	.889	.842	.634	.681
100.00	.835	.766	.733	.695	.529	.564

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	32.310	26.680	25.590	25.452	25.064	25.193
.60	30.104	25.390	24.442	24.328	24.009	24.086
.80	27.819	23.740	22.920	22.823	22.550	22.614
1.00	25.804	22.186	21.449	21.364	21.125	21.178
1.20	24.100	20.805	20.134	20.058	19.845	19.885
1.40	22.660	19.602	18.980	18.912	18.719	18.751
1.60	21.428	18.559	17.969	17.906	17.730	17.752
1.80	20.353	17.647	17.082	17.024	16.861	16.874
2.00	19.396	16.840	16.298	16.244	16.093	16.098
3.00	15.664	13.782	13.367	13.326	13.213	13.209
4.00	13.109	11.616	11.317	11.284	11.194	11.205
5.00	11.326	10.063	9.796	9.769	9.694	9.703
6.00	9.981	8.897	8.688	8.665	8.601	8.598
7.00	8.929	7.980	7.785	7.765	7.709	7.714
8.00	8.082	7.239	7.067	7.050	7.000	7.005
9.00	7.387	6.628	6.474	6.458	6.414	6.419
10.00	6.805	6.115	5.976	5.962	5.921	5.926
20.00	3.859	3.493	3.420	3.412	3.391	3.393
40.00	2.130	1.936	1.896	1.892	1.882	1.881
60.00	1.497	1.363	1.334	1.332	1.325	1.324
80.00	1.164	1.061	1.038	1.037	1.031	1.030
100.00	.957	.873	.855	.853	.849	.848

$^{24}_{12}Mg$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	25.301	19.328	19.629	16.010	8.004	10.371
.60	24.756	19.408	19.503	16.326	8.200	10.230
.80	23.566	18.870	18.889	16.060	8.215	10.101
1.00	22.293	18.136	18.123	15.582	8.142	9.936
1.20	21.107	17.360	17.328	15.030	8.024	9.741
1.40	20.039	16.606	16.557	14.462	7.881	9.527
1.60	19.085	15.901	15.831	13.907	7.726	9.302
1.80	18.239	15.251	15.157	13.379	7.566	9.074
2.00	17.484	14.658	14.535	12.881	7.404	8.847
3.00	14.598	12.365	12.109	10.863	6.634	7.792
4.00	12.504	10.766	10.463	9.445	5.976	6.917
5.00	10.912	9.526	9.244	8.392	5.425	6.204
6.00	9.742	8.522	8.277	7.557	4.962	5.619
7.00	8.772	7.717	7.482	6.867	4.570	5.134
8.00	7.996	7.077	6.824	6.286	4.234	4.727
9.00	7.349	6.523	6.284	5.796	3.944	4.379
10.00	6.802	6.056	5.836	5.385	3.691	4.080
20.00	3.942	3.568	3.418	3.195	2.288	2.505
40.00	2.198	2.006	1.919	1.807	1.340	1.445
60.00	1.550	1.417	1.356	1.281	.961	1.032
80.00	1.207	1.106	1.058	1.002	.755	.810
100.00	.994	.911	.872	.827	.629	.671

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	34.519	28.591	27.474	27.325	26.909	27.074
.60	32.517	27.491	26.504	26.380	26.035	26.138
.80	30.298	25.907	25.043	24.936	24.639	24.724
1.00	28.293	24.365	23.579	23.485	23.223	23.294
1.20	26.577	22.971	22.249	22.165	21.930	21.984
1.40	25.116	21.746	21.069	20.992	20.779	20.822
1.60	23.859	20.675	20.026	19.956	19.760	19.790
1.80	22.756	19.734	19.108	19.043	18.861	18.879
2.00	21.768	18.898	18.292	18.232	18.062	18.070
3.00	17.830	15.681	15.204	15.158	15.029	15.023
4.00	15.061	13.337	12.990	12.952	12.849	12.859
5.00	13.102	11.631	11.316	11.285	11.199	11.207
6.00	11.607	10.337	10.090	10.063	9.988	9.982
7.00	10.425	9.308	9.075	9.052	8.987	8.990
8.00	9.467	8.471	8.266	8.245	8.187	8.191
9.00	8.674	7.776	7.592	7.573	7.521	7.525
10.00	8.007	7.189	7.022	7.005	6.958	6.962
20.00	4.580	4.144	4.056	4.047	4.022	4.024
40.00	2.534	2.304	2.255	2.251	2.239	2.238
60.00	1.781	1.622	1.588	1.585	1.577	1.575
80.00	1.385	1.263	1.236	1.234	1.227	1.226
100.00	1.139	1.039	1.017	1.015	1.010	1.009

27. Al 13. IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	26.967	20.791	21.260	17.339	8.630	11.218
.60	26.613	21.025	21.270	17.799	8.893	11.132
.80	25.499	20.556	20.710	17.601	8.951	11.046
1.00	24.250	19.845	19.957	17.151	8.908	10.910
1.20	23.064	19.068	19.153	16.603	8.810	10.734
1.40	21.983	18.301	18.359	16.026	8.680	10.531
1.60	21.012	17.575	17.603	15.454	8.534	10.312
1.80	20.145	16.903	16.896	14.903	8.378	10.086
2.00	19.370	16.285	16.240	14.382	8.217	9.856
3.00	16.369	13.877	13.655	12.238	7.433	8.761
4.00	14.138	12.175	11.880	10.712	6.741	7.828
5.00	12.414	10.836	10.554	9.569	6.152	7.057
6.00	11.139	9.736	9.489	8.654	5.651	6.417
7.00	10.067	8.847	8.605	7.890	5.222	5.882
8.00	9.206	8.139	7.869	7.242	4.852	5.429
9.00	8.483	7.520	7.262	6.692	4.530	5.042
10.00	7.869	6.995	6.759	6.229	4.248	4.706
20.00	4.606	4.165	3.994	3.732	2.664	2.921
40.00	2.578	2.351	2.250	2.119	1.570	1.693
60.00	1.819	1.663	1.591	1.504	1.128	1.210
80.00	1.417	1.298	1.242	1.176	.886	.951
100.00	1.167	1.070	1.024	.971	.739	.787

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	36.610	30.417	29.284	29.125	28.682	28.885
.60	34.811	29.508	28.492	28.359	27.987	28.121
.80	32.668	27.995	27.097	26.982	26.660	26.770
1.00	30.685	26.474	25.649	25.547	25.262	25.355
1.20	28.969	25.077	24.311	24.220	23.963	24.034
1.40	27.499	23.837	23.113	23.029	22.795	22.852
1.60	26.228	22.748	22.048	21.970	21.754	21.796
1.80	25.108	21.787	21.105	21.033	20.832	20.858
2.00	24.099	20.929	20.265	20.197	20.009	20.023
3.00	19.994	17.585	17.049	16.997	16.853	16.845
4.00	17.036	15.082	14.688	14.646	14.528	14.540
5.00	14.918	13.236	12.873	12.838	12.739	12.748
6.00	13.283	11.821	11.536	11.505	11.420	11.411
7.00	11.978	10.686	10.415	10.389	10.314	10.316
8.00	10.912	9.757	9.516	9.492	9.425	9.428
9.00	10.024	8.980	8.763	8.742	8.681	8.684
10.00	9.273	8.320	8.123	8.104	8.049	8.052
20.00	5.355	4.844	4.739	4.729	4.700	4.702
40.00	2.973	2.702	2.645	2.640	2.626	2.625
60.00	2.090	1.903	1.863	1.860	1.850	1.849
80.00	1.626	1.482	1.450	1.448	1.441	1.439
100.00	1.337	1.220	1.194	1.192	1.186	1.184

28. Si 14. IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	28.576	22.225	22.870	18.651	9.248	12.055
.60	28.410	22.615	23.019	19.258	9.577	12.025
.80	27.376	22.217	22.519	19.131	9.680	11.983
1.00	26.156	21.533	21.784	18.713	9.668	11.879
1.20	24.975	20.760	20.975	18.173	9.591	11.725
1.40	23.888	19.984	20.163	17.591	9.476	11.536
1.60	22.904	19.241	19.381	17.005	9.339	11.325
1.80	22.023	18.549	18.644	16.435	9.189	11.101
2.00	21.232	17.910	17.957	15.892	9.033	10.871
3.00	18.140	15.402	15.224	13.633	8.339	9.744
4.00	15.790	13.608	13.331	12.008	7.519	8.759
5.00	13.942	12.175	11.902	10.780	6.895	7.932
6.00	12.570	10.984	10.744	9.788	6.358	7.240
7.00	11.402	10.014	9.774	8.953	5.894	6.656
8.00	10.459	9.240	8.960	8.278	5.492	6.159
9.00	9.663	8.558	8.287	7.629	5.139	5.732
10.00	8.982	7.978	7.728	7.115	4.829	5.361
20.00	5.314	4.800	4.609	4.304	3.061	3.363
40.00	2.987	2.724	2.607	2.455	1.817	1.960
60.00	2.109	1.928	1.845	1.744	1.307	1.403
80.00	1.643	1.505	1.440	1.364	1.027	1.103
100.00	1.353	1.241	1.187	1.126	.857	.913

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	38.604	32.173	31.031	30.863	30.393	30.637
.60	37.004	31.451	30.416	30.274	29.877	30.044
.80	34.942	30.014	29.091	28.968	28.632	28.761
1.00	32.989	28.520	27.665	27.555	27.248	27.364
1.20	31.282	27.126	26.326	26.227	25.948	26.040
1.40	29.812	25.879	25.116	25.025	24.770	24.854
1.60	28.536	24.778	24.034	23.949	23.714	23.769
1.80	27.408	23.803	23.072	22.994	22.774	22.811
2.00	26.386	22.931	22.213	22.140	21.933	21.955
3.00	22.149	19.485	18.894	18.837	18.677	18.670
4.00	19.023	16.842	16.403	16.356	16.225	16.240
5.00	16.763	14.868	14.458	14.419	14.308	14.318
6.00	14.998	13.342	13.018	12.984	12.888	12.876
7.00	13.577	12.107	11.797	11.766	11.681	11.683
8.00	12.408	11.088	10.811	10.784	10.708	10.710
9.00	11.428	10.232	9.982	9.957	9.888	9.890
10.00	10.595	9.501	9.273	9.250	9.188	9.190
20.00	6.181	5.589	5.467	5.455	5.422	5.423
40.00	3.445	3.131	3.065	3.059	3.042	3.041
60.00	2.424	2.207	2.161	2.157	2.145	2.144
80.00	1.885	1.718	1.682	1.679	1.671	1.669
100.00	1.551	1.414	1.384	1.382	1.375	1.373

31.
15. P IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	30.137	23.635	24.461	19.948	9.859	12.883
.60	30.155	24.180	24.751	20.703	10.255	12.910
.80	29.202	23.856	24.315	20.651	10.403	12.914
1.00	28.016	23.202	23.602	20.267	10.422	12.844
1.20	26.844	22.436	22.791	19.739	10.368	12.713
1.40	25.756	21.653	21.964	19.185	10.269	12.539
1.60	24.764	20.897	21.160	18.658	10.143	12.338
1.80	23.873	20.188	20.397	17.972	10.001	12.119
2.00	23.071	19.531	19.682	17.409	9.849	11.890
3.00	19.908	16.935	16.812	15.044	9.052	10.739
4.00	17.452	15.059	14.809	13.326	8.308	9.706
5.00	15.491	13.540	13.285	12.019	7.652	8.827
6.00	14.030	12.262	12.037	10.956	7.082	8.084
7.00	12.770	11.215	10.982	10.051	6.585	7.453
8.00	11.749	10.378	10.091	9.271	6.150	6.913
9.00	10.882	9.634	9.353	8.603	5.768	6.447
10.00	10.137	8.998	8.739	8.038	5.430	6.040
20.00	6.062	5.472	5.261	4.910	3.480	3.830
40.00	3.425	3.121	2.990	2.815	2.079	2.245
60.00	2.420	2.213	2.118	2.001	1.499	1.610
80.00	1.886	1.727	1.653	1.565	1.179	1.265
100.00	1.554	1.424	1.363	1.292	1.083	1.048

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	40.518	33.870	32.726	32.549	32.053	32.339
.60	39.113	33.331	32.284	32.134	31.713	31.915
.80	37.133	31.973	31.033	30.901	30.532	30.702
1.00	35.215	30.510	29.632	29.514	29.185	29.328
1.20	33.523	29.124	28.296	28.190	27.890	28.005
1.40	32.060	27.875	27.079	26.981	26.706	26.800
1.60	30.787	26.767	25.985	25.894	25.639	25.711
1.80	29.657	25.784	25.010	24.925	24.687	24.736
2.00	28.629	24.902	24.137	24.057	23.833	23.864
3.00	24.289	21.379	20.736	20.673	20.497	20.493
4.00	21.016	18.611	18.130	18.078	17.933	17.951
5.00	18.627	16.520	16.064	16.020	15.898	15.909
6.00	16.743	14.891	14.530	14.492	14.384	14.370
7.00	15.213	13.562	13.212	13.178	13.083	13.084
8.00	13.946	12.458	12.145	12.114	12.029	12.030
9.00	12.877	11.525	11.241	11.213	11.136	11.137
10.00	11.965	10.725	10.465	10.440	10.369	10.370
20.00	7.056	6.378	6.237	6.224	6.186	6.187
40.00	3.951	3.590	3.514	3.507	3.488	3.486
60.00	2.782	2.533	2.479	2.475	2.462	2.460
80.00	2.164	1.973	1.931	1.927	1.918	1.916
100.00	1.780	1.624	1.589	1.587	1.579	1.577

32.
16. S IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	31.657	25.022	26.033	21.230	10.463	13.703
.60	31.856	25.723	26.467	22.136	10.926	13.789
.80	30.985	25.474	26.098	22.161	11.119	13.839
1.00	29.834	24.853	25.411	21.815	11.171	13.804
1.20	28.675	24.095	24.602	21.301	11.140	13.697
1.40	27.588	23.309	23.763	20.716	11.058	13.541
1.60	26.592	22.542	22.939	20.111	10.945	13.350
1.80	25.695	21.818	22.152	19.511	10.811	13.138
2.00	24.886	21.146	21.411	18.931	10.664	12.912
3.00	21.670	18.473	18.416	16.469	9.870	11.742
4.00	19.120	16.324	16.310	14.665	9.106	10.666
5.00	17.055	14.926	14.696	13.284	8.421	9.738
6.00	15.512	13.565	13.363	12.151	7.819	8.946
7.00	14.166	12.444	12.225	11.180	7.291	8.270
8.00	13.070	11.546	11.260	10.337	6.825	7.688
9.00	12.135	10.742	10.457	9.610	6.414	7.184
10.00	11.328	10.052	9.789	8.995	6.049	6.742
20.00	6.849	6.178	5.949	5.549	3.918	4.319
40.00	3.890	3.544	3.397	3.197	2.358	2.548
60.00	2.752	2.516	2.409	2.275	1.704	1.830
80.00	2.146	1.965	1.881	1.780	1.340	1.439
100.00	1.768	1.620	1.551	1.470	1.119	1.193

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	42.363	35.517	34.376	34.190	33.669	33.999
.60	41.147	35.158	34.105	33.946	33.501	33.740
.80	39.252	33.878	32.927	32.787	32.396	32.599
1.00	37.372	32.448	31.555	31.429	31.078	31.251
1.20	35.700	31.075	30.226	30.112	29.793	29.932
1.40	34.249	29.828	29.006	28.901	28.606	28.722
1.60	32.984	28.718	27.904	27.806	27.532	27.622
1.80	31.857	27.731	26.919	26.828	26.571	26.636
2.00	30.829	26.843	26.036	25.949	25.707	25.750
3.00	26.410	23.262	22.570	22.502	22.310	22.311
4.00	23.007	20.383	19.863	19.806	19.648	19.671
5.00	20.503	18.187	17.686	17.638	17.503	17.517
6.00	18.510	16.462	16.065	16.023	15.904	15.887
7.00	16.879	15.045	14.656	14.618	14.513	14.513
8.00	15.519	13.861	13.511	13.477	13.382	13.382
9.00	14.366	12.854	12.535	12.504	12.418	12.419
10.00	13.376	11.986	11.694	11.666	11.587	11.588
20.00	7.975	7.206	7.046	7.031	6.988	6.989
40.00	4.489	4.078	3.991	3.984	3.962	3.960
60.00	3.164	2.881	2.820	2.814	2.800	2.798
80.00	2.462	2.244	2.197	2.193	2.182	2.179
100.00	2.025	1.847	1.808	1.805	1.796	1.794

$^{35}_{17}Cl$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	33.140	26.390	27.589	22.500	11.061	14.515
.60	33.517	27.246	28.168	23.556	11.590	14.660
.80	32.728	27.072	27.869	23.660	11.830	14.758
1.00	31.614	26.486	27.210	23.354	11.915	14.758
1.20	30.470	25.740	26.407	22.857	11.908	14.678
1.40	29.388	24.951	25.559	22.275	11.844	14.540
1.60	28.391	24.176	24.718	21.662	11.744	14.363
1.80	27.491	23.440	23.909	21.050	11.620	14.158
2.00	26.677	22.754	23.144	20.455	11.480	13.936
3.00	23.422	20.015	20.032	17.904	10.692	12.753
4.00	20.791	18.001	17.831	16.020	9.911	11.638
5.00	18.630	16.330	16.133	14.570	9.200	10.664
6.00	17.012	14.890	14.719	13.373	8.569	9.826
7.00	15.584	13.698	13.501	12.337	8.010	9.105
8.00	14.418	12.742	12.461	11.432	7.516	8.483
9.00	13.417	11.880	11.595	10.648	7.076	7.940
10.00	12.550	11.138	10.874	9.984	6.685	7.464
20.00	7.671	6.917	6.670	6.218	4.374	4.831
40.00	4.383	3.992	3.828	3.602	2.652	2.868
60.00	3.105	2.838	2.718	2.567	1.920	2.063
80.00	2.422	2.218	2.123	2.010	1.512	1.624
100.00	1.995	1.829	1.751	1.660	1.263	1.346

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	44.151	37.121	35.988	35.793	35.247	35.621
.60	43.119	36.937	35.884	35.716	35.248	35.526
.80	41.307	35.736	34.780	34.632	34.219	34.456
1.00	39.467	34.342	33.438	33.305	32.933	33.137
1.20	37.818	32.983	32.119	31.997	31.658	31.825
1.40	36.384	31.741	30.898	30.786	30.473	30.612
1.60	35.130	30.633	29.791	29.687	29.395	29.504
1.80	34.012	29.644	28.800	28.702	28.428	28.509
2.00	32.988	28.755	27.910	27.817	27.558	27.614
3.00	28.510	25.133	24.396	24.322	24.115	24.120
4.00	24.993	22.156	21.599	21.537	21.365	21.394
5.00	22.387	19.863	19.320	19.267	19.119	19.137
6.00	20.294	18.051	17.619	17.572	17.442	17.424
7.00	18.569	16.551	16.123	16.082	15.966	15.967
8.00	17.121	15.291	14.904	14.866	14.762	14.763
9.00	15.887	14.213	13.860	13.826	13.731	13.731
10.00	14.824	13.281	12.956	12.925	12.838	12.838
20.00	8.936	8.073	7.892	7.875	7.827	7.827
40.00	5.058	4.595	4.497	4.488	4.463	4.461
60.00	3.570	3.250	3.181	3.175	3.159	3.156
80.00	2.779	2.533	2.479	2.475	2.462	2.460
100.00	2.286	2.085	2.041	2.038	2.028	2.025

$^{40}_{18}Ar$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	34.593	27.739	29.131	23.757	11.653	15.321
.60	35.143	28.749	29.856	24.965	12.249	15.524
.80	34.436	28.653	29.628	25.150	12.535	15.671
1.00	33.360	28.103	29.000	24.885	12.653	15.709
1.20	32.233	27.370	28.204	24.407	12.672	15.656
1.40	31.157	26.581	27.349	23.829	12.627	15.538
1.60	30.162	25.800	26.493	23.212	12.540	15.373
1.80	29.261	25.053	25.665	22.590	12.426	15.178
2.00	28.446	24.355	24.878	21.980	12.294	14.962
3.00	25.165	21.557	21.658	19.347	11.516	13.770
4.00	22.462	19.487	19.368	17.389	10.722	12.620
5.00	20.212	17.748	17.592	15.876	9.988	11.603
6.00	18.527	16.234	16.100	14.616	9.329	10.720
7.00	17.021	14.973	14.805	13.519	8.742	9.957
8.00	15.788	13.963	13.693	12.553	8.219	9.294
9.00	14.726	13.043	12.765	11.714	7.753	8.715
10.00	13.801	12.250	11.992	11.001	7.335	8.206
20.00	8.527	7.686	7.424	6.917	4.847	5.363
40.00	4.902	4.463	4.283	4.029	2.961	3.205
60.00	3.478	3.178	3.045	2.875	2.149	2.310
80.00	2.714	2.485	2.379	2.252	1.694	1.820
100.00	2.237	2.050	1.963	1.861	1.415	1.509

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	45.890	38.687	37.565	37.361	36.792	37.211
.60	45.034	38.674	37.625	37.449	36.959	37.276
.80	43.305	37.551	36.595	36.440	36.005	36.278
1.00	41.507	36.194	35.284	35.144	34.752	34.988
1.20	39.884	34.852	33.977	33.849	33.490	33.685
1.40	38.468	33.617	32.759	32.640	32.308	32.472
1.60	37.230	32.513	31.649	31.539	31.228	31.360
1.80	36.124	31.527	30.655	30.551	30.259	30.358
2.00	35.108	30.639	29.760	29.662	29.385	29.457
3.00	30.588	26.990	26.211	26.131	25.909	25.921
4.00	26.971	23.926	23.335	23.268	23.082	23.119
5.00	24.273	21.546	20.961	20.903	20.743	20.766
6.00	22.089	19.653	19.188	19.137	18.995	18.976
7.00	20.276	18.075	17.610	17.565	17.438	17.441
8.00	18.746	16.744	16.321	16.280	16.165	16.167
9.00	17.436	15.599	15.212	15.174	15.070	15.071
10.00	16.302	14.605	14.247	14.213	14.117	14.117
20.00	9.936	8.974	8.773	8.754	8.700	8.700
40.00	5.658	5.139	5.029	5.019	4.992	4.989
60.00	3.999	3.641	3.563	3.557	3.538	3.535
80.00	3.115	2.839	2.778	2.774	2.760	2.756
100.00	2.563	2.338	2.288	2.284	2.273	2.270

$^{40}_{20}Ca$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	37.418	30.390	32.172	26.340	12.824	16.915
.60	38.306	31.706	33.192	27.751	13.552	17.236
.80	37.760	31.766	33.112	28.101	13.931	17.481
1.00	36.761	31.290	32.552	27.925	14.117	17.595
1.20	35.672	30.598	31.776	27.489	14.187	17.600
1.40	34.614	29.804	30.914	26.925	14.181	17.524
1.60	33.627	29.013	30.033	26.303	14.125	17.390
1.80	32.731	28.251	29.171	25.664	14.034	17.216
2.00	31.918	27.534	28.346	25.031	13.919	17.013
3.00	28.617	24.642	24.930	22.251	13.171	15.818
4.00	25.797	22.478	22.483	20.161	12.358	14.609
5.00	23.390	20.619	20.565	18.532	11.584	13.512
6.00	21.587	18.966	18.928	17.161	10.876	12.546
7.00	19.940	17.578	17.486	15.948	10.236	11.702
8.00	18.584	16.466	16.235	14.866	9.660	10.963
9.00	17.406	15.439	15.187	13.918	9.142	10.313
10.00	16.372	14.548	14.315	13.111	8.675	9.738
20.00	10.329	9.309	9.021	8.395	5.839	6.484
40.00	6.015	5.475	5.261	4.947	3.620	3.926
60.00	4.284	3.914	3.752	3.542	2.641	2.842
80.00	3.348	3.065	2.935	2.778	2.086	2.243
100.00	2.760	2.530	2.422	2.296	1.745	1.861

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	49.243	41.726	40.633	40.412	39.797	40.308
.60	48.726	42.042	41.011	40.819	40.285	40.684
.80	47.157	41.072	40.127	39.957	39.480	39.829
1.00	45.444	39.791	38.882	38.727	38.295	38.601
1.20	43.876	38.486	37.602	37.460	37.063	37.320
1.40	42.504	37.272	36.393	36.261	35.892	36.112
1.60	41.304	36.182	35.285	35.162	34.816	34.995
1.80	40.230	35.207	34.290	34.173	33.846	33.987
2.00	39.238	34.327	33.393	33.282	32.972	33.078
3.00	34.676	30.660	29.806	29.716	29.463	29.493
4.00	30.894	27.451	26.800	26.723	26.509	26.565
5.00	28.042	24.919	24.257	24.190	24.005	24.041
6.00	25.700	22.884	22.357	22.298	22.132	22.114
7.00	23.731	21.167	20.629	20.576	20.428	20.435
8.00	22.051	19.704	19.211	19.163	19.028	19.032
9.00	20.601	18.435	17.980	17.936	17.812	17.815
10.00	19.334	17.324	16.902	16.861	16.747	16.749
20.00	12.041	10.873	10.627	10.604	10.540	10.538
40.00	6.946	6.307	6.172	6.160	6.126	6.122
60.00	4.927	4.484	4.389	4.381	4.358	4.354
80.00	3.842	3.501	3.427	3.421	3.404	3.400
100.00	3.163	2.885	2.824	2.819	2.805	2.801

$^{48}_{22}Ti$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	40.155	32.905	35.164	28.683	13.978	18.486
.60	41.367	34.604	36.480	30.499	14.836	18.926
.80	40.979	34.820	36.554	31.017	15.308	19.272
1.00	40.058	34.423	36.068	30.934	15.564	19.464
1.20	39.009	33.754	35.319	30.546	15.687	19.529
1.40	37.974	32.980	34.455	30.000	15.722	19.499
1.60	37.000	32.184	33.555	29.378	15.698	19.399
1.80	36.114	31.410	32.665	28.728	15.632	19.249
2.00	35.310	30.679	31.806	28.076	15.536	19.063
3.00	32.022	27.718	28.221	25.170	14.831	17.880
4.00	29.114	25.403	25.637	22.965	14.008	16.622
5.00	26.573	23.523	23.597	21.238	13.207	15.455
6.00	24.674	21.745	21.829	19.767	12.451	14.413
7.00	22.900	20.240	20.249	18.448	11.764	13.493
8.00	21.435	19.037	18.865	17.257	11.139	12.682
9.00	20.152	17.909	17.704	16.206	10.573	11.964
10.00	19.019	16.927	16.739	15.308	10.059	11.326
20.00	12.240	11.033	10.728	9.974	6.887	7.675
40.00	7.224	6.574	6.329	5.946	4.332	4.708
60.00	5.167	4.719	4.529	4.274	3.178	3.425
80.00	4.045	3.702	3.548	3.357	2.517	2.709
100.00	3.337	3.058	2.930	2.777	2.108	2.250

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	52.464	44.661	43.605	43.368	42.708	43.312
.60	52.263	45.291	44.288	44.082	43.504	43.989
.80	50.847	44.470	43.548	43.363	42.846	43.273
1.00	49.218	43.264	42.369	42.200	41.729	42.108
1.20	47.709	41.999	41.120	40.965	40.530	40.853
1.40	46.385	40.810	39.925	39.781	39.376	39.655
1.60	45.229	39.740	38.825	38.688	38.308	38.540
1.80	44.195	38.782	37.834	37.705	37.345	37.531
2.00	43.236	37.918	36.942	36.819	36.476	36.622
3.00	38.676	34.269	33.353	33.251	32.968	33.020
4.00	34.766	30.947	30.246	30.160	29.918	29.997
5.00	31.794	28.290	27.557	27.482	27.271	27.324
6.00	29.320	26.135	25.553	25.486	25.297	25.282
7.00	27.218	24.298	23.692	23.631	23.461	23.474
8.00	25.407	22.718	22.158	22.103	21.947	21.957
9.00	23.830	21.338	20.817	20.766	20.623	20.630
10.00	22.443	20.120	19.635	19.587	19.454	19.460
20.00	14.270	12.685	12.593	12.566	12.490	12.488
40.00	8.345	7.576	7.412	7.398	7.357	7.353
60.00	5.944	5.409	5.294	5.284	5.256	5.252
80.00	4.642	4.231	4.140	4.133	4.112	4.107
100.00	3.824	3.488	3.414	3.408	3.391	3.387

$^{52}_{24}Cr$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	42.820	35.533	38.112	31.091	15.116	20.038
.60	44.345	37.449	39.726	33.212	16.105	20.596
.80	44.110	37.822	39.956	33.900	16.669	21.044
1.00	43.266	37.505	39.548	33.914	16.996	21.317
1.20	42.259	36.873	38.831	33.577	17.173	21.445
1.40	41.248	36.111	37.970	33.054	17.251	21.462
1.60	40.291	35.314	37.057	32.436	17.260	21.399
1.80	39.419	34.533	36.142	31.778	17.221	21.275
2.00	38.629	33.791	35.255	31.111	17.146	21.109
3.00	35.379	30.780	31.519	28.096	16.492	19.950
4.00	32.408	28.494	28.819	25.793	15.669	18.654
5.00	29.751	26.449	26.673	23.981	14.837	17.424
6.00	27.773	24.558	24.788	22.423	14.049	16.312
7.00	25.887	22.946	23.078	21.006	13.318	15.321
8.00	24.326	21.662	21.569	19.712	12.649	14.442
9.00	22.949	20.440	20.300	18.562	12.037	13.660
10.00	21.724	19.373	19.247	17.580	11.479	12.962
20.00	14.246	12.848	12.536	11.642	7.983	8.926
40.00	8.523	7.755	7.480	7.024	5.093	5.547
60.00	6.124	5.593	5.373	5.069	3.758	4.055
80.00	4.804	4.396	4.216	3.989	2.984	3.215
100.00	3.967	3.636	3.484	3.302	2.503	2.673

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	55.580	47.512	46.498	46.247	45.542	46.240
.60	55.677	48.442	47.476	47.255	46.636	47.207
.80	54.406	47.765	46.875	46.676	46.119	46.628
1.00	52.858	46.633	45.762	45.580	45.071	45.526
1.20	51.407	45.410	44.546	44.377	43.907	44.299
1.40	50.135	44.249	43.368	43.211	42.771	43.114
1.60	49.028	43.201	42.278	42.130	41.715	42.004
1.80	48.038	42.266	41.297	41.156	40.763	40.999
2.00	47.117	41.423	40.415	40.280	39.905	40.094
3.00	42.591	37.820	36.850	36.738	36.425	36.502
4.00	38.582	34.409	33.667	33.571	33.302	33.408
5.00	35.517	31.649	30.853	30.769	30.533	30.606
6.00	32.935	29.394	28.763	28.687	28.475	28.465
7.00	30.719	27.452	26.782	26.713	26.521	26.544
8.00	28.793	25.769	25.146	25.083	24.907	24.925
9.00	27.104	24.288	23.706	23.648	23.485	23.498
10.00	25.609	22.974	22.427	22.373	22.222	22.232
20.00	16.604	14.995	14.656	14.625	14.536	14.535
40.00	9.846	8.938	8.745	8.728	8.680	8.674
60.00	7.046	6.412	6.275	6.263	6.230	6.225
80.00	5.514	5.025	4.917	4.909	4.884	4.878
100.00	4.547	4.147	4.059	4.051	4.032	4.026

$^{56}_{26}Fe$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	45.424	38.038	41.022	33.469	16.242	21.572
.60	47.252	40.249	42.933	35.892	17.358	22.249
.80	47.165	40.778	43.321	36.753	18.016	22.798
1.00	46.397	40.542	42.995	36.866	18.413	23.153
1.20	45.433	39.949	42.313	36.584	18.645	23.346
1.40	44.448	39.201	41.459	36.086	18.767	23.413
1.60	43.510	38.406	40.535	35.475	18.811	23.388
1.80	42.655	37.619	39.601	34.812	18.800	23.294
2.00	41.882	36.869	38.688	34.133	18.748	23.149
3.00	38.690	33.825	34.819	31.023	18.152	22.025
4.00	35.673	31.505	32.020	28.635	17.335	20.699
5.00	32.918	29.389	29.782	26.752	16.484	19.413
6.00	30.877	27.395	27.791	25.117	15.664	18.236
7.00	28.890	25.684	25.961	23.611	14.894	17.179
8.00	27.244	24.329	24.333	22.220	14.183	16.235
9.00	25.782	23.019	22.963	20.977	13.530	15.392
10.00	24.474	21.873	21.828	19.914	12.930	14.637
20.00	16.332	14.743	14.433	13.391	9.122	10.232
40.00	9.904	9.013	8.711	8.174	5.900	6.439
60.00	7.152	6.532	6.283	5.925	4.378	4.731
80.00	5.623	5.146	4.939	4.671	3.487	3.760
100.00	4.649	4.260	4.085	3.870	2.929	3.132

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	58.609	50.293	49.326	49.059	48.312	49.104
.60	58.988	51.512	50.588	50.352	49.693	50.351
.80	57.854	50.973	50.122	49.909	49.314	49.906
1.00	56.385	49.913	49.074	48.879	48.333	48.867
1.20	54.992	48.732	47.891	47.710	47.204	47.669
1.40	53.773	47.600	46.732	46.563	46.089	46.497
1.60	52.716	46.578	45.656	45.496	45.048	45.396
1.80	51.775	45.667	44.687	44.535	44.109	44.398
2.00	50.895	44.849	43.818	43.672	43.265	43.500
3.00	46.427	41.314	40.298	40.176	39.834	39.940
4.00	42.343	37.834	37.060	36.954	36.658	36.794
5.00	39.206	34.989	34.137	34.043	33.782	33.879
6.00	36.536	32.649	31.978	31.893	31.657	31.655
7.00	34.222	30.617	29.889	29.813	29.598	29.633
8.00	32.196	28.843	28.162	28.092	27.894	27.922
9.00	30.407	27.272	26.632	26.567	26.383	26.406
10.00	28.815	25.870	25.266	25.205	25.035	25.052
20.00	19.028	17.189	16.803	16.767	16.665	16.665
40.00	11.441	10.387	10.162	10.142	10.086	10.080
60.00	8.230	7.489	7.328	7.315	7.277	7.270
80.00	6.455	5.882	5.756	5.746	5.717	5.710
100.00	5.328	4.860	4.756	4.748	4.725	4.718

$^{58}_{28}Ni$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	47.976	40.506	43.897	35.817	17.356	23.091
.60	50.097	43.008	46.103	38.543	18.599	23.886
.80	50.155	43.697	46.652	39.577	19.349	24.537
1.00	49.461	43.538	46.410	39.791	19.817	24.975
1.20	48.539	42.984	45.766	39.566	20.105	25.233
1.40	47.581	42.253	44.922	39.096	20.271	25.352
1.60	46.663	41.461	43.991	38.495	20.352	25.367
1.80	45.828	40.671	43.039	37.830	20.370	25.304
2.00	45.074	39.916	42.104	37.141	20.342	25.182
3.00	41.956	36.851	38.116	33.947	19.810	24.102
4.00	38.910	34.510	35.231	31.486	19.005	22.753
5.00	36.068	32.335	32.916	29.543	18.140	21.419
6.00	33.979	30.248	30.831	27.841	17.292	20.182
7.00	31.901	28.447	28.888	26.254	16.487	19.062
8.00	30.179	27.028	27.146	24.772	15.738	18.057
9.00	28.641	25.637	25.680	23.439	15.044	17.156
10.00	27.258	24.417	24.470	22.300	14.405	16.345
20.00	18.490	16.710	16.411	15.213	10.298	11.586
40.00	11.362	10.343	10.017	9.394	6.748	7.381
60.00	8.248	7.534	7.256	6.340	5.037	5.452
80.00	6.500	5.949	5.715	5.403	4.024	4.344
100.00	5.382	4.932	4.731	4.482	3.386	3.623

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	61.567	53.016	52.098	51.216	51.026	51.912
.60	62.213	54.512	53.635	53.385	52.686	53.432
.80	61.209	54.106	53.300	53.073	52.440	53.117
1.00	59.815	53.117	52.315	52.107	51.526	52.139
1.20	58.479	51.976	51.165	50.972	50.431	50.970
1.40	57.312	50.874	50.027	49.845	49.338	49.815
1.60	56.308	49.879	48.965	48.793	48.313	48.723
1.80	55.416	48.996	48.011	47.847	47.390	47.734
2.00	54.582	48.204	47.157	47.001	46.563	46.847
3.00	50.189	44.754	43.700	43.568	43.197	43.334
4.00	46.048	41.222	40.422	40.307	39.984	40.154
5.00	42.858	38.307	37.404	37.301	37.015	37.138
6.00	40.116	35.897	35.190	35.097	34.837	34.845
7.00	37.719	33.786	33.005	32.920	32.683	32.733
8.00	35.606	31.933	31.197	31.119	30.900	30.940
9.00	33.729	30.281	29.586	29.513	29.310	29.343
10.00	32.048	28.799	28.140	28.072	27.882	27.909
20.00	21.529	19.456	19.023	18.982	18.867	18.869
40.00	13.124	11.916	11.658	11.635	11.571	11.564
60.00	9.491	8.636	8.451	8.435	8.391	8.384
80.00	7.462	6.800	6.654	6.642	6.609	6.601
100.00	6.168	5.626	5.506	5.496	5.469	5.461

$^{64}_{30}Zn$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	50.484	42.940	46.739	38.140	18.459	24.596
.60	52.890	45.729	49.241	41.166	19.828	25.507
.80	53.088	46.567	49.951	42.374	20.670	26.262
1.00	52.467	46.495	49.795	42.691	21.208	26.783
1.20	51.586	45.982	49.191	42.524	21.553	27.107
1.40	50.655	45.268	48.359	42.085	21.764	27.280
1.60	49.758	44.481	47.423	41.495	21.882	27.336
1.80	48.944	43.690	46.456	40.829	21.930	27.305
2.00	48.211	42.931	45.501	40.132	21.927	27.209
3.00	45.179	39.856	41.407	36.865	21.465	26.179
4.00	42.116	37.508	38.449	34.341	20.677	24.814
5.00	39.200	35.285	36.069	32.348	19.803	23.435
6.00	37.073	33.112	33.898	30.569	18.930	22.143
7.00	34.915	31.228	31.850	28.927	18.094	20.964
8.00	33.126	29.753	30.001	27.359	17.309	19.901
9.00	31.519	28.287	28.444	25.942	16.578	18.944
10.00	30.068	26.997	27.164	24.731	15.901	18.082
20.00	20.710	18.739	18.463	17.100	11.507	12.984
40.00	12.691	11.740	11.394	10.679	7.635	8.368
60.00	9.408	8.595	8.290	7.811	5.731	6.213
80.00	7.434	6.804	6.543	6.184	4.593	4.965
100.00	6.164	5.648	5.423	5.136	3.873	4.148

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	64.463	55.687	54.821	54.524	53.693	54.672
.60	65.364	57.452	56.625	56.361	55.622	56.458
.80	64.484	57.175	56.416	56.177	55.506	56.269
1.00	63.161	56.252	55.494	55.274	54.657	55.351
1.20	61.880	55.152	54.377	54.171	53.597	54.211
1.40	60.766	54.080	53.259	53.065	52.525	53.072
1.60	59.814	53.113	52.213	52.030	51.518	51.991
1.80	58.974	52.258	51.275	51.101	50.612	51.013
2.00	58.187	51.495	50.439	50.271	49.803	50.138
3.00	53.883	48.144	47.057	46.915	46.516	46.686
4.00	49.700	44.572	43.754	43.629	43.279	43.485
5.00	46.472	41.599	40.651	40.540	40.229	40.381
6.00	43.672	39.131	38.395	38.293	38.009	38.030
7.00	41.205	36.953	36.123	36.030	35.770	35.837
8.00	39.016	35.029	34.243	34.157	33.917	33.972
9.00	37.060	33.305	32.559	32.479	32.255	32.301
10.00	35.300	31.751	31.041	30.966	30.756	30.794
20.00	24.096	21.785	21.307	21.261	21.132	21.137
40.00	14.886	13.518	13.226	13.200	13.128	13.121
60.00	10.824	9.851	9.639	9.622	9.571	9.563
80.00	8.534	7.777	7.610	7.597	7.559	7.550
100.00	7.065	6.443	6.306	6.295	6.264	6.255

$^{74}_{32}Ge$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	52.951	45.344	49.553	40.440	19.552	26.087
.60	55.636	48.417	52.347	43.764	21.046	27.115
.80	55.970	49.408	53.220	45.146	21.980	27.972
1.00	55.419	49.417	53.151	45.567	22.589	28.578
1.20	54.579	48.945	52.589	45.459	22.989	28.969
1.40	53.675	48.249	51.771	45.052	23.247	29.195
1.60	52.800	47.468	50.832	44.475	23.402	29.295
1.80	52.007	46.677	49.852	43.810	23.481	29.298
2.00	51.297	45.916	48.878	43.107	23.504	29.227
3.00	48.362	42.841	44.688	39.775	23.116	28.255
4.00	45.293	40.495	41.669	37.197	22.350	26.880
5.00	42.311	38.232	39.234	35.163	21.470	25.461
6.00	40.157	35.983	36.987	33.354	20.576	24.117
7.00	37.926	34.022	34.841	31.625	19.711	22.883
8.00	36.079	32.497	32.889	29.976	18.893	21.764
9.00	34.411	30.961	31.247	28.479	18.127	20.754
10.00	32.896	29.608	29.903	27.199	17.415	19.841
20.00	22.983	20.824	20.581	19.046	12.745	14.420
40.00	14.485	13.200	12.839	12.025	8.557	9.399
60.00	10.629	9.713	9.382	8.837	6.460	7.015
80.00	8.422	7.710	7.422	7.013	5.193	5.622
100.00	6.994	6.410	6.158	5.831	4.388	4.704

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	67.307	58.314	57.501	57.189	56.318	57.390
.60	68.452	60.339	59.564	59.287	58.510	59.434
.80	67.688	60.185	59.479	59.227	58.520	59.368
1.00	66.433	59.328	58.617	58.384	57.732	58.508
1.20	65.205	58.267	57.532	57.314	56.707	57.397
1.40	64.143	57.225	56.434	56.229	55.657	56.274
1.60	63.244	56.206	55.405	55.211	54.667	55.205
1.80	62.457	55.461	54.485	54.299	53.780	54.239
2.00	61.718	54.728	53.668	53.489	52.991	53.378
3.00	57.514	51.485	50.372	50.220	49.792	49.999
4.00	53.301	47.885	47.054	46.919	46.543	46.787
5.00	50.047	44.866	43.878	43.758	43.422	43.605
6.00	47.201	42.350	41.389	41.279	41.171	41.206
7.00	44.675	40.114	39.238	39.137	38.855	38.941
8.00	42.420	38.128	37.296	37.202	36.940	37.011
9.00	40.394	36.340	35.546	35.459	35.214	35.274
10.00	38.563	34.720	33.961	33.879	33.650	33.700
20.00	26.718	24.170	23.645	23.594	23.451	23.460
40.00	16.722	15.188	14.869	14.833	14.751	14.745
60.00	12.227	11.128	10.890	10.870	10.814	10.804
80.00	9.668	8.810	8.622	8.606	8.563	8.553
100.00	8.016	7.311	7.155	7.143	7.108	7.098

$^{79}_{35}Br$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	56.588	48.898	53.722	43.848	21.176	28.302
.60	59.676	52.391	56.954	47.617	22.854	29.503
.80	60.209	53.609	58.070	49.260	23.924	30.514
1.00	59.760	53.740	58.134	49.837	24.640	31.246
1.20	58.978	53.330	57.638	49.821	25.125	31.740
1.40	58.115	52.662	56.843	49.463	25.452	32.048
1.60	57.274	51.891	55.903	48.909	25.664	32.213
1.80	56.514	51.101	54.906	48.249	25.791	32.269
2.00	55.839	50.339	53.908	47.539	25.853	32.239
3.00	53.064	47.278	49.589	44.121	25.584	31.363
4.00	50.002	44.952	46.496	41.477	24.857	29.982
5.00	46.937	42.646	43.996	39.397	23.975	28.512
6.00	44.760	40.292	41.650	37.527	23.056	27.096
7.00	42.433	38.227	39.368	35.708	22.153	25.784
8.00	40.510	36.641	37.272	33.946	21.289	24.588
9.00	38.761	35.008	35.511	32.335	20.474	23.502
10.00	37.164	33.567	34.080	30.960	19.712	22.517
20.00	26.479	24.044	23.869	22.064	14.650	16.639
40.00	16.989	15.497	15.122	14.151	10.002	11.019
60.00	12.567	11.491	11.126	10.472	7.614	8.288
80.00	10.002	9.158	8.831	8.340	6.150	6.671
100.00	8.327	7.633	7.343	6.950	5.212	5.597

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	71.487	62.182	61.450	61.117	60.185	61.396
.60	72.979	64.582	63.891	63.593	62.759	63.817
.80	72.381	64.606	63.984	63.712	62.952	63.930
1.00	71.221	63.843	63.208	62.957	62.254	63.154
1.20	70.069	62.838	62.170	61.935	61.278	62.085
1.40	69.083	61.840	61.102	60.881	60.261	60.987
1.60	68.263	60.944	60.099	59.888	59.299	59.936
1.80	67.555	60.164	59.206	59.004	58.441	58.989
2.00	66.891	59.479	58.420	58.226	57.683	58.151
3.00	62.852	56.414	55.270	55.102	54.633	54.896
4.00	58.612	52.788	51.947	51.798	51.383	51.688
5.00	55.339	49.716	48.675	48.542	48.169	48.402
6.00	52.443	47.145	46.356	46.233	45.890	45.949
7.00	49.846	44.836	43.901	43.788	43.472	43.589
8.00	47.507	42.772	41.876	41.771	41.477	41.576
9.00	45.391	40.899	40.040	39.942	39.666	39.750
10.00	43.466	39.192	38.367	38.274	38.015	38.087
20.00	30.740	27.833	27.242	27.183	27.018	27.035
40.00	19.599	17.809	17.431	17.397	17.301	17.295
60.00	14.452	13.156	12.876	12.853	12.786	12.775
80.00	11.478	10.462	10.239	10.220	10.169	10.157
100.00	9.542	8.704	8.518	8.503	8.462	8.450

$^{84}_{36}Kr$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	57.784	50.071	55.099	44.974	21.713	29.035
.60	61.005	53.702	58.477	48.891	23.452	30.294
.80	61.602	54.994	59.673	50.620	24.568	31.356
1.00	61.186	55.165	59.782	51.250	25.318	32.130
1.20	60.423	54.776	59.308	51.265	25.832	32.658
1.40	59.573	54.118	58.522	50.924	26.182	32.994
1.60	58.743	53.350	57.582	50.377	26.414	33.181
1.80	57.995	52.562	56.580	49.719	26.557	33.254
2.00	57.331	51.799	55.574	49.007	26.632	33.239
3.00	54.613	48.746	51.216	45.565	26.405	32.397
4.00	51.558	46.431	48.102	42.901	25.692	31.016
5.00	48.468	44.114	45.586	40.809	24.810	29.530
6.00	46.287	41.728	43.211	38.923	23.884	28.093
7.00	43.931	39.631	40.886	37.076	22.969	26.757
8.00	41.986	38.027	38.744	35.279	22.092	25.535
9.00	40.213	36.364	36.945	33.631	21.262	24.425
10.00	38.591	34.896	35.488	32.227	20.483	23.418
20.00	27.664	25.139	24.992	23.094	15.296	17.394
40.00	17.851	16.290	15.913	14.886	10.499	11.578
60.00	13.240	12.109	11.734	11.041	8.013	8.730
80.00	10.553	9.665	9.325	8.805	6.483	7.037
100.00	8.793	8.061	7.758	7.343	5.500	5.909

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	72.860	63.454	62.749	62.409	61.458	62.715
.60	74.464	65.976	65.313	65.008	64.156	65.259
.80	73.917	66.057	65.464	65.186	64.408	65.429
1.00	72.788	65.324	64.716	64.459	63.739	64.681
1.20	71.661	64.337	63.693	63.452	62.779	63.625
1.40	70.699	63.353	62.635	62.408	61.773	62.535
1.60	69.906	62.472	61.640	61.424	60.820	61.491
1.80	69.225	61.707	60.757	60.550	59.971	60.551
2.00	68.585	61.038	59.981	59.782	59.225	59.721
3.00	64.605	58.036	56.883	56.711	56.228	56.510
4.00	60.359	54.405	53.562	53.409	52.981	53.308
5.00	57.085	51.319	50.263	50.125	49.740	49.991
6.00	54.176	48.733	47.937	47.810	47.456	47.523
7.00	51.559	46.404	45.451	45.334	45.007	45.135
8.00	49.196	44.317	43.402	43.293	42.988	43.097
9.00	47.054	42.420	41.540	41.438	41.152	41.245
10.00	45.101	40.686	39.840	39.744	39.475	39.555
20.00	32.100	29.074	28.461	28.400	28.227	28.248
40.00	20.589	18.712	18.315	18.279	18.179	18.174
60.00	15.224	13.861	13.566	13.541	13.470	13.460
80.00	12.110	11.038	10.803	10.784	10.729	10.717
100.00	10.076	9.192	8.996	8.980	8.936	8.924

$^{88}_{38}Sr$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	60.155	52.398	57.836	47.211	22.782	30.492
.60	63.636	56.303	61.503	51.422	24.642	31.866
.80	64.359	57.744	62.862	53.324	25.847	33.030
1.00	64.008	57.996	63.060	54.059	26.669	33.888
1.20	63.283	57.648	62.631	54.137	27.239	34.486
1.40	62.458	57.009	61.863	53.830	27.636	34.877
1.60	61.650	56.249	60.923	53.300	27.906	35.110
1.80	60.925	55.462	59.912	52.646	28.082	35.219
2.00	60.287	54.700	58.892	51.932	28.185	35.233
3.00	57.686	51.666	54.460	48.442	28.041	34.462
4.00	54.647	49.378	51.312	45.746	27.360	33.084
5.00	51.513	47.045	48.766	43.634	26.482	31.570
6.00	49.329	44.598	46.338	41.719	25.544	30.091
7.00	46.919	42.440	43.932	39.821	24.607	28.707
8.00	44.935	40.805	41.701	37.956	23.702	27.437
9.00	43.118	39.085	39.831	36.239	22.843	26.280
10.00	41.449	37.565	38.325	34.777	22.034	25.228
20.00	30.060	27.358	27.274	25.185	16.603	18.924
40.00	19.613	17.913	17.536	16.395	11.513	12.720
60.00	14.625	13.382	12.989	12.216	8.834	9.639
80.00	11.691	10.711	10.347	9.767	7.169	7.793
100.00	9.759	8.949	8.621	8.157	6.095	6.556

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	75.578	65.974	65.324	64.970	63.980	65.329
.60	77.400	68.735	68.129	67.812	66.923	68.114
.80	76.955	68.928	68.394	68.103	67.291	68.399
1.00	75.884	68.254	67.701	67.432	66.679	67.705
1.20	74.804	67.302	66.707	66.455	65.750	66.675
1.40	73.891	66.346	65.669	65.431	64.765	65.601
1.60	73.150	65.493	64.691	64.465	63.830	64.569
1.80	72.522	64.759	63.827	63.610	63.002	63.643
2.00	71.933	64.123	63.073	62.864	62.278	62.829
3.00	68.072	61.250	60.083	59.901	59.392	59.713
4.00	63.821	57.613	56.772	56.610	56.156	56.526
5.00	60.549	54.505	53.420	53.274	52.866	53.152
6.00	57.621	51.895	51.088	50.953	50.575	50.660
7.00	54.970	49.530	48.543	48.418	48.069	48.221
8.00	52.564	47.402	46.451	46.334	46.008	46.138
9.00	50.373	45.458	44.541	44.431	44.125	44.237
10.00	48.368	43.676	42.791	42.687	42.398	42.495
20.00	34.847	31.582	30.927	30.860	30.673	30.700
40.00	22.610	20.555	20.123	20.084	19.974	19.970
60.00	16.811	15.308	14.985	14.957	14.879	14.868
80.00	13.414	12.228	11.968	11.947	11.887	11.874
100.00	11.182	10.201	9.984	9.967	9.918	9.90[illegible]

$^{90}_{40}Zr$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	62.500	54.703	60.551	49.431	23.843	31.940
.60	66.235	58.880	64.505	53.934	25.823	33.427
.80	67.082	60.468	66.026	56.009	27.119	34.693
1.00	66.793	60.799	66.314	56.849	28.010	35.636
1.20	66.105	60.492	65.931	56.989	28.638	36.303
1.40	65.306	59.872	65.181	56.718	29.081	36.751
1.60	64.520	59.120	64.243	56.205	29.390	37.029
1.80	63.818	58.337	63.224	55.556	29.599	37.175
2.00	63.204	57.576	62.190	54.839	29.729	37.219
3.00	60.725	54.566	57.690	51.307	29.672	36.523
4.00	57.710	52.311	54.513	48.583	29.026	35.151
5.00	54.536	49.966	51.947	46.459	28.153	33.612
6.00	52.356	47.463	49.471	44.520	27.205	32.093
7.00	49.897	45.250	46.989	42.576	26.249	30.664
8.00	47.878	43.588	44.673	40.647	25.319	29.347
9.00	46.021	41.815	42.736	38.862	24.431	28.146
10.00	44.310	40.247	41.184	37.347	23.593	27.051
20.00	32.468	29.613	29.600	27.316	17.928	20.479
40.00	21.423	19.583	19.212	17.951	12.553	13.896
60.00	16.058	14.702	14.293	13.437	9.681	10.581
80.00	12.876	11.800	11.414	10.770	7.881	8.580
100.00	10.768	9.876	9.524	9.009	6.715	7.231

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	78.263	68.465	67.870	67.503	66.474	67.914
.60	80.295	71.459	70.913	70.582	69.657	70.937
.80	79.947	71.761	71.288	70.985	70.138	71.333
1.00	78.931	71.143	70.648	70.367	69.582	70.690
1.20	77.898	70.225	69.682	69.419	68.682	69.686
1.40	77.032	69.297	68.663	68.414	67.717	68.628
1.60	76.343	68.472	67.702	67.465	66.801	67.608
1.80	75.768	67.769	66.858	66.630	65.993	66.696
2.00	75.229	67.166	66.126	65.906	65.292	65.899
3.00	71.492	64.427	63.249	63.057	62.521	62.883
4.00	67.241	60.770	59.953	59.782	59.303	59.717
5.00	63.978	57.665	56.555	56.401	55.968	56.292
6.00	61.037	55.037	54.222	54.079	53.678	53.782
7.00	58.359	52.642	51.623	51.491	51.119	51.296
8.00	55.916	50.478	49.493	49.369	49.021	49.173
9.00	53.682	48.493	47.540	47.423	47.096	47.228
10.00	51.631	46.667	45.745	45.634	45.325	45.440
20.00	37.624	34.121	33.425	33.353	33.150	33.186
40.00	24.683	22.448	21.981	21.937	21.817	21.815
60.00	18.452	16.807	16.453	16.423	16.337	16.326
80.00	14.769	13.465	13.180	13.157	13.091	13.077
100.00	12.335	11.255	11.016	10.997	10.943	10.928

$^{98}_{42}Mo$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	64.821	56.987	63.245	51.634	24.898	33.379
.60	68.805	61.433	67.485	56.427	26.997	34.978
.80	69.773	63.167	69.167	58.674	28.382	36.346
1.00	69.546	63.577	69.545	59.619	29.343	37.374
1.20	68.892	63.311	69.208	59.823	30.027	38.110
1.40	68.118	62.711	68.477	59.587	30.517	38.614
1.60	67.353	61.966	67.541	59.091	30.866	38.938
1.80	66.674	61.186	66.515	58.448	31.108	39.122
2.00	66.087	60.427	65.469	57.730	31.266	39.196
3.00	63.733	57.444	60.906	54.159	31.298	38.579
4.00	60.745	55.928	57.707	51.412	30.688	37.216
5.00	57.536	52.878	55.126	49.280	29.824	35.655
6.00	55.366	50.323	52.608	47.323	28.867	34.098
7.00	52.862	48.057	50.054	45.337	27.893	32.626
8.00	50.814	46.374	47.657	43.347	26.939	31.265
9.00	48.922	44.551	45.656	41.499	26.025	30.019
10.00	47.172	42.939	44.064	39.932	25.159	28.884
20.00	34.943	31.899	31.968	29.483	19.269	22.056
40.00	23.277	21.298	20.938	19.553	13.618	15.101
60.00	17.538	16.066	15.645	14.701	10.554	11.553
80.00	14.104	12.931	12.525	11.813	8.618	9.395
100.00	11.818	10.842	10.466	9.897	7.359	7.934

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	80.917	70.928	70.390	70.009	68.942	70.473
.60	83.153	74.151	73.664	73.321	72.360	73.728
.80	82.898	74.559	74.147	73.832	72.951	74.233
1.00	81.935	73.995	73.559	73.267	72.449	73.641
1.20	80.945	73.110	72.620	72.346	71.578	72.661
1.40	80.126	72.208	71.620	71.360	70.633	71.618
1.60	79.488	71.411	70.676	70.428	69.735	70.611
1.80	78.966	70.739	69.851	69.613	68.947	69.713
2.00	78.478	70.169	69.141	68.912	68.270	68.934
3.00	74.868	67.568	66.382	66.181	65.618	66.021
4.00	70.622	63.936	63.107	62.927	62.422	62.882
5.00	67.373	60.799	59.667	59.504	59.047	59.410
6.00	64.426	58.159	57.339	57.188	56.764	56.888
7.00	61.725	55.738	54.691	54.551	54.157	54.360
8.00	59.251	53.543	52.527	52.395	52.027	52.202
9.00	56.979	51.522	50.536	50.412	50.064	50.218
10.00	54.887	49.656	48.699	48.582	48.252	48.387
20.00	40.426	36.686	35.951	35.873	35.655	35.700
40.00	26.803	24.386	23.883	23.836	23.705	23.705
60.00	20.144	18.353	17.969	17.936	17.842	17.831
80.00	16.173	14.748	14.438	14.412	14.340	14.325
100.00	13.535	12.351	12.069	12.068	12.010	11.994

$^{102}_{44}Ru$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	67.119	59.053	65.920	53.821	25.946	34.809
.60	71.349	63.264	70.444	58.902	28.164	36.520
.80	72.434	65.343	72.287	61.321	29.637	37.989
1.00	72.266	66.332	72.750	62.571	30.666	39.101
1.20	71.647	66.106	72.464	63.638	31.409	39.907
1.40	70.897	65.524	71.753	62.438	31.946	40.468
1.60	70.154	64.786	70.819	61.960	32.334	40.839
1.80	69.498	64.011	69.786	61.224	32.609	41.061
2.00	68.936	63.254	68.729	60.605	32.796	41.166
3.00	66.711	60.303	64.106	56.958	32.918	40.630
4.00	63.755	58.129	60.890	54.232	32.347	39.279
5.00	60.515	55.978	58.301	52.098	31.493	37.697
6.00	58.358	53.176	55.747	50.127	30.529	36.105
7.00	55.815	50.461	53.125	48.103	29.539	34.591
8.00	53.740	49.160	50.951	46.056	28.563	33.187
9.00	51.817	47.091	48.589	44.146	27.624	31.900
10.00	50.033	45.638	46.960	42.534	26.731	30.724
20.00	37.422	34.214	34.372	31.382	20.624	23.654
40.00	25.172	23.054	22.710	21.197	14.705	16.335
60.00	19.060	17.472	17.043	16.007	11.451	12.555
80.00	15.374	14.102	13.677	12.896	9.379	10.239
100.00	12.907	11.846	11.447	10.821	8.025	8.663

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	83.543	73.367	72.886	72.491	71.386	73.007
.60	85.976	76.813	76.387	76.031	75.035	76.491
.80	85.811	77.324	76.976	76.649	75.734	77.102
1.00	84.898	76.812	76.437	76.133	75.283	76.560
1.20	83.951	75.959	75.524	75.239	74.441	75.603
1.40	83.177	75.083	74.542	74.271	73.515	74.574
1.60	82.589	74.313	73.615	73.357	72.635	73.579
1.80	82.120	73.672	72.809	72.561	71.867	72.696
2.00	81.683	73.136	72.122	71.883	71.213	71.935
3.00	78.202	70.675	69.484	69.273	68.683	69.128
4.00	73.964	67.052	66.234	66.044	65.515	66.022
5.00	70.735	63.908	62.756	62.585	62.104	62.507
6.00	67.787	61.259	60.439	60.279	59.832	59.978
7.00	65.070	58.818	57.746	57.598	57.182	57.412
8.00	62.569	56.597	55.553	55.413	55.023	55.224
9.00	60.264	54.544	53.527	53.396	53.027	53.203
10.00	58.134	52.642	51.653	51.528	51.179	51.335
20.00	43.250	39.275	38.501	38.418	38.185	38.239
40.00	28.967	26.365	25.827	25.777	25.635	25.638
60.00	21.884	19.943	19.529	19.493	19.392	19.381
80.00	17.625	16.075	15.738	15.710	15.631	15.616
100.00	14.779	13.488	13.204	13.181	13.116	13.100

$^{106}_{46}Pd$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	69.395	61.500	68.576	55.993	26.989	36.230
.60	73.867	66.475	73.383	61.361	29.324	38.054
.80	75.068	68.498	75.386	63.951	30.685	39.623
1.00	74.958	69.063	75.944	65.106	31.985	40.820
1.20	74.372	68.877	75.700	65.436	32.783	41.695
1.40	73.645	68.315	75.008	65.272	33.367	42.313
1.60	72.923	67.587	74.078	64.813	33.794	42.731
1.80	72.290	66.813	73.039	64.183	34.103	42.991
2.00	71.754	66.058	71.969	63.463	34.319	43.127
3.00	69.660	63.141	67.291	59.823	34.533	42.675
4.00	66.739	61.016	64.064	57.043	34.002	41.339
5.00	63.473	58.668	61.472	54.911	33.160	39.738
6.00	61.334	56.021	58.887	52.731	32.191	38.113
7.00	58.754	53.661	56.200	50.872	31.166	36.559
8.00	56.658	51.946	53.651	49.270	30.190	35.114
9.00	54.707	50.034	51.532	46.802	29.226	33.787
10.00	52.891	48.342	49.871	45.142	28.308	32.572
20.00	39.922	36.554	36.810	33.910	21.992	25.271
40.00	27.105	24.848	24.527	22.880	15.813	17.595
60.00	20.624	18.919	18.484	17.353	12.372	13.584
80.00	16.685	15.312	14.871	14.016	10.153	11.110
100.00	14.034	12.885	12.465	11.780	8.716	9.417

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	86.142	75.783	75.358	74.950	73.808	75.519
.60	88.768	79.448	79.084	78.715	77.683	79.227
.80	88.689	80.059	79.775	79.436	78.488	79.943
1.00	87.824	79.598	79.284	78.969	78.087	79.448
1.20	86.917	78.774	78.397	78.101	77.272	78.514
1.40	86.168	77.924	77.431	77.150	76.365	77.499
1.60	85.650	77.181	76.520	76.252	75.502	76.516
1.80	85.233	76.570	75.734	75.476	74.755	75.647
2.00	84.847	76.068	75.070	74.821	74.124	74.903
3.00	81.497	73.751	72.555	72.335	71.720	72.207
4.00	77.271	70.139	69.334	69.136	68.582	69.137
5.00	74.066	66.992	65.823	65.643	65.139	65.583
6.00	71.121	64.340	63.521	63.353	62.883	63.050
7.00	68.392	61.883	60.787	60.631	60.194	60.452
8.00	65.869	59.639	58.568	58.421	58.010	58.236
9.00	63.535	57.557	56.512	56.373	55.984	56.184
10.00	61.372	55.623	54.604	54.472	54.103	54.280
20.00	46.092	41.884	41.073	40.984	40.735	40.800
40.00	31.170	28.383	27.810	27.756	27.603	27.609
60.00	23.669	21.576	21.132	21.092	20.983	20.973
80.00	19.121	17.444	17.080	17.049	16.964	16.949
100.00	16.066	14.665	14.357	14.332	14.262	14.245

$^{114}_{48}Cd$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	71.652	63.730	71.215	58.151	28.026	37.644
.60	76.362	68.967	76.302	63.804	30.477	39.578
.80	77.676	71.131	78.465	66.564	32.125	41.248
1.00	77.623	71.773	79.113	67.824	33.295	42.529
1.20	77.068	71.627	78.915	68.217	34.149	43.474
1.40	76.364	71.084	78.243	68.089	34.781	44.150
1.60	75.663	70.364	77.317	67.649	35.248	44.614
1.80	75.052	69.593	76.272	67.026	35.590	44.913
2.00	74.542	68.840	75.192	66.306	35.834	45.080
3.00	72.582	65.960	70.461	62.635	36.142	44.714
4.00	69.700	63.887	67.227	59.844	35.653	43.395
5.00	66.409	61.545	64.637	57.718	34.824	41.778
6.00	64.293	58.858	62.024	55.732	33.853	40.121
7.00	61.680	56.455	59.277	53.643	32.834	38.529
8.00	59.564	54.730	56.657	51.489	31.818	37.044
9.00	57.590	52.778	54.484	49.465	30.831	35.677
10.00	55.746	51.050	52.793	47.762	29.883	34.426
20.00	42.440	38.917	39.279	36.166	23.372	26.903
40.00	29.073	26.678	26.385	24.601	16.940	18.880
60.00	22.227	20.403	19.967	18.737	13.313	14.639
80.00	18.034	16.559	16.103	15.172	10.968	12.007
100.00	15.198	13.960	13.519	12.773	9.423	10.197

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	88.718	78.178	77.809	77.387	76.208	78.009
.60	91.531	82.058	81.755	81.373	80.307	81.938
.80	91.534	82.766	82.546	82.196	81.215	82.756
1.00	90.715	82.353	82.102	81.776	80.863	82.307
1.20	89.848	81.559	81.239	80.932	80.074	81.395
1.40	89.162	80.733	80.290	79.999	79.185	80.394
1.60	88.672	80.016	79.395	79.117	78.339	79.422
1.80	88.307	79.436	78.628	78.360	77.611	78.567
2.00	87.973	78.967	77.988	77.729	77.004	77.842
3.00	84.755	76.795	75.599	75.369	74.728	75.259
4.00	80.544	73.199	72.410	72.203	71.624	72.228
5.00	77.367	70.052	69.868	68.680	68.153	68.638
6.00	74.428	67.400	66.585	66.409	65.917	66.107
7.00	71.691	64.930	63.813	63.649	63.191	63.478
8.00	69.150	62.667	61.573	61.419	60.986	61.239
9.00	66.792	60.561	59.490	59.344	58.934	59.158
10.00	64.599	58.598	57.551	57.412	57.023	57.222
20.00	48.950	44.510	43.663	43.569	43.304	43.381
40.00	33.411	30.437	29.829	29.770	29.607	29.617
60.00	25.496	23.249	22.774	22.731	22.613	22.605
80.00	20.660	18.852	18.461	18.428	18.336	18.320
100.00	17.394	15.880	15.548	15.521	15.445	15.427

$^{120}_{50}Sn$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	73.691	65.944	73.837	60.295	29.057	39.051
.60	78.835	71.440	79.203	66.232	31.624	41.095
.80	80.260	73.745	81.525	69.161	33.359	42.864
1.00	80.261	74.463	82.262	70.525	34.599	44.230
1.20	79.738	74.356	82.112	70.982	35.509	45.244
1.40	79.056	73.831	81.460	70.891	36.187	45.977
1.60	78.375	73.119	80.537	70.469	36.694	46.489
1.80	77.787	72.351	79.486	69.853	37.070	46.827
2.00	77.302	71.602	78.396	69.133	37.343	47.026
3.00	75.477	68.760	73.615	65.434	37.746	46.748
4.00	72.637	66.742	70.378	62.634	37.300	45.447
5.00	69.324	64.411	67.795	60.518	36.487	43.816
6.00	67.235	61.686	65.160	58.531	35.513	42.129
7.00	64.591	59.243	62.355	56.414	34.482	40.501
8.00	62.460	57.511	59.666	54.210	33.447	38.977
9.00	60.464	55.520	57.442	52.133	32.439	37.572
10.00	58.595	53.760	55.725	50.389	31.471	36.284
20.00	44.973	41.300	41.775	38.445	24.761	28.551
40.00	31.073	28.541	28.282	26.357	18.085	20.188
60.00	23.866	21.924	21.491	20.158	14.275	15.719
80.00	19.420	17.842	17.374	16.363	11.793	12.928
100.00	16.397	15.068	14.609	13.798	10.153	11.000

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	91.270	80.552	80.240	79.805	78.589	80.479
.60	94.267	84.643	84.402	84.008	82.908	84.626
.80	94.349	85.446	85.292	84.930	83.916	85.544
1.00	93.573	85.080	84.893	84.556	83.612	85.140
1.20	92.744	84.314	84.053	83.736	82.848	84.248
1.40	92.100	83.512	83.120	82.819	81.976	83.260
1.60	91.659	82.821	82.241	81.953	81.146	82.300
1.80	91.346	82.271	81.493	81.215	80.439	81.459
2.00	91.062	81.836	80.876	80.607	79.856	80.752
3.00	87.978	79.811	78.615	78.376	77.709	78.284
4.00	83.785	76.232	75.461	75.246	74.642	75.295
5.00	80.638	73.088	71.892	71.695	71.145	71.673
6.00	77.711	70.440	69.632	69.448	68.933	69.145
7.00	74.969	67.961	66.825	66.654	66.173	66.490
8.00	72.413	65.683	64.567	64.405	63.951	64.231
9.00	70.033	63.554	62.460	62.306	61.876	62.125
10.00	67.814	61.565	60.492	60.346	59.937	60.160
20.00	51.821	47.151	46.270	46.170	45.869	45.978
40.00	35.685	32.523	31.881	31.818	31.644	31.658
60.00	27.363	24.960	24.453	24.408	24.281	24.274
80.00	22.239	20.298	19.880	19.844	19.745	19.729
100.00	18.761	17.132	16.775	16.746	16.664	16.645

$^{127}_{53}I$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	77.216	69.237	77.741	63.487	30.595	41.147
.60	82.505	75.117	83.523	69.846	33.334	43.355
.80	84.093	77.631	86.081	73.029	35.199	45.274
1.00	84.174	78.461	86.953	74.549	36.541	46.765
1.20	83.696	78.411	86.872	75.100	37.535	47.884
1.40	83.045	77.914	86.251	75.064	38.284	48.703
1.60	82.393	77.214	85.334	74.670	38.850	49.286
1.80	81.839	76.451	84.275	74.065	39.277	49.683
2.00	81.393	75.705	83.169	73.346	39.594	49.931
3.00	79.774	72.925	78.318	69.607	40.141	49.788
4.00	77.000	70.996	75.084	66.800	39.763	48.518
5.00	73.660	68.587	71.518	64.705	38.974	46.869
6.00	71.616	65.909	69.855	62.722	38.000	45.139
7.00	68.931	63.411	66.970	60.569	36.952	43.457
8.00	66.783	61.675	64.183	58.296	35.892	41.878
9.00	64.760	59.631	61.887	56.140	34.852	40.418
10.00	62.859	57.826	60.138	54.340	33.851	39.078
20.00	48.798	44.908	45.566	41.905	26.862	31.048
40.00	34.128	31.395	31.197	29.053	19.834	22.189
60.00	26.389	24.269	23.846	22.354	15.753	17.384
80.00	21.564	19.829	19.349	18.213	13.068	14.355
100.00	18.260	16.792	16.308	15.396	11.284	12.247

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	95.060	84.078	83.851	83.396	82.126	84.148
.60	98.323	88.479	88.332	87.920	86.768	88.617
.80	98.519	89.420	89.366	88.986	87.924	89.680
1.00	97.805	89.122	89.032	88.678	87.688	89.342
1.20	97.029	88.396	88.225	87.892	86.960	88.480
1.40	96.447	87.627	87.315	86.998	86.113	87.510
1.60	96.078	86.975	86.458	86.155	85.308	86.566
1.80	95.841	86.469	85.738	85.446	84.630	85.746
2.00	95.633	86.084	85.156	84.873	84.082	85.065
3.00	92.751	84.284	83.090	82.838	82.133	82.773
4.00	88.587	80.735	79.994	79.766	79.126	79.854
5.00	85.492	77.601	76.388	76.179	75.594	76.187
6.00	82.587	74.964	74.169	73.973	73.424	73.672
7.00	79.845	72.476	71.316	71.132	70.620	70.982
8.00	77.274	70.130	69.035	68.862	68.377	68.699
9.00	74.867	68.024	66.897	66.733	66.272	66.561
10.00	72.614	66.002	64.893	64.737	64.298	64.558
20.00	56.147	51.135	50.205	50.096	49.792	49.901
40.00	39.154	35.709	35.016	34.947	34.755	34.777
60.00	30.232	27.591	27.038	26.988	26.848	26.843
80.00	24.680	22.535	22.075	22.035	21.925	21.910
100.00	20.883	19.075	18.680	18.648	18.557	18.538

$^{132}_{54}Xe$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	78.316	70.327	79.034	64.545	31.105	41.843
.60	83.719	76.335	84.954	71.044	33.901	44.105
.80	85.360	78.917	87.592	74.311	35.809	46.073
1.00	85.467	79.785	88.507	75.883	37.185	47.606
1.20	85.003	79.754	88.451	76.465	38.208	48.760
1.40	84.363	79.265	87.839	76.447	38.980	49.608
1.60	83.721	78.569	86.924	76.063	39.566	50.215
1.80	83.178	77.808	85.863	75.462	40.010	50.631
2.00	82.744	77.064	84.752	74.743	40.341	50.895
3.00	81.195	74.305	79.878	70.992	40.937	50.798
4.00	78.444	72.406	76.646	68.183	40.582	49.539
5.00	75.095	70.106	74.088	66.096	39.802	47.885
6.00	73.068	67.311	71.418	64.117	38.828	46.141
7.00	70.370	64.797	68.508	61.953	37.775	44.443
8.00	68.218	63.060	65.689	59.657	36.707	42.845
9.00	66.183	61.000	63.370	57.477	35.657	41.367
10.00	64.276	59.181	61.611	55.659	34.645	40.011
20.00	50.079	46.118	46.842	43.069	27.566	31.886
40.00	35.160	32.361	32.186	29.967	20.424	22.866
60.00	27.246	25.067	24.650	23.102	16.255	17.950
80.00	22.295	20.508	20.024	18.846	13.502	14.842
100.00	18.898	17.382	16.892	15.943	11.671	12.674

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	96.313	85.245	85.045	84.585	83.296	85.362
.60	99.662	89.747	89.631	89.213	88.044	89.936
.80	99.895	90.733	90.712	90.327	89.249	91.048
1.00	99.201	90.457	90.400	90.041	89.035	90.731
1.20	98.443	89.743	89.604	89.265	88.318	89.878
1.40	97.881	88.986	88.700	88.379	87.479	88.914
1.60	97.535	88.346	87.851	87.543	86.682	87.975
1.80	97.324	87.855	87.140	86.843	86.013	87.162
2.00	97.140	87.487	86.569	86.282	85.478	86.490
3.00	94.327	85.762	84.570	84.313	83.596	84.258
4.00	90.173	82.224	81.494	81.261	80.610	81.362
5.00	87.097	79.094	77.877	77.663	77.068	77.682
6.00	84.201	76.462	75.673	75.473	74.913	75.173
7.00	81.460	73.973	72.805	72.618	72.094	72.473
8.00	78.885	71.672	70.519	70.342	69.846	70.183
9.00	76.471	69.509	68.372	68.204	67.733	68.035
10.00	74.208	67.476	66.357	66.196	65.748	66.020
20.00	57.593	52.469	51.523	51.411	51.099	51.215
40.00	40.325	36.785	36.075	36.004	35.806	35.831
60.00	31.206	28.485	27.917	27.865	27.720	27.717
80.00	25.512	23.297	22.823	22.783	22.668	22.654
100.00	21.608	19.740	19.332	19.299	19.205	19.185

$^{138}_{56}Ba$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	80.505	72.498	81.611	66.653	32.122	43.229
.60	86.133	78.758	87.806	73.430	35.031	45.599
.80	87.879	81.477	90.600	76.864	37.025	47.666
1.00	88.037	82.418	91.604	78.539	38.469	49.283
1.20	87.601	82.425	91.594	79.185	39.548	50.506
1.40	86.981	81.954	91.002	79.203	40.367	51.412
1.60	86.357	81.265	90.092	78.837	40.992	52.067
1.80	85.836	80.507	89.025	78.245	41.470	52.522
2.00	85.429	79.766	87.904	77.526	41.831	52.819
3.00	84.018	77.050	82.987	73.751	42.525	52.814
4.00	81.315	75.216	79.762	70.942	42.216	51.579
5.00	77.951	72.935	77.223	68.874	41.455	49.914
6.00	75.960	70.109	74.541	66.902	40.482	48.145
7.00	73.239	67.561	71.581	64.719	39.421	46.413
8.00	71.079	65.828	68.700	62.381	38.337	44.780
9.00	69.035	63.736	66.338	60.152	37.267	43.267
10.00	67.106	61.890	64.562	58.300	36.233	41.877
20.00	52.648	48.550	49.408	45.408	28.979	33.571
40.00	37.244	34.312	34.188	31.817	21.616	24.235
60.00	28.984	26.686	26.283	24.623	17.271	19.098
80.00	23.782	21.889	21.402	20.134	14.384	15.832
100.00	20.196	18.585	18.082	17.062	12.457	13.544

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	98.805	87.565	87.423	86.949	85.624	87.778
.60	102.326	92.269	92.216	91.786	90.583	92.561
.80	102.630	93.343	93.389	92.993	91.883	93.768
1.00	101.974	93.110	93.118	92.748	91.712	93.491
1.20	101.249	92.421	92.342	91.994	91.018	92.657
1.40	100.727	91.684	91.453	91.121	90.194	91.704
1.60	100.427	91.069	90.618	90.300	89.412	90.775
1.80	100.267	90.607	89.926	89.619	88.763	89.975
2.00	100.133	90.273	89.378	89.081	88.251	89.322
3.00	97.456	88.698	87.510	87.245	86.503	87.209
4.00	93.324	85.183	84.477	84.236	83.561	84.364
5.00	90.286	82.064	80.839	80.618	79.999	80.657
6.00	87.410	79.443	78.668	78.460	77.878	78.162
7.00	84.674	76.954	75.773	75.578	75.033	75.443
8.00	82.093	74.646	73.476	73.292	72.776	73.142
9.00	79.666	72.469	71.314	71.138	70.647	70.977
10.00	77.385	70.419	69.278	69.111	68.643	68.941
20.00	60.491	55.142	54.166	54.048	53.720	53.851
40.00	42.685	38.955	38.212	38.138	37.928	37.958
60.00	33.179	30.296	29.697	29.642	29.487	29.487
80.00	27.202	24.847	24.345	24.302	24.180	24.166
100.00	23.084	21.093	20.660	20.625	20.524	20.504

$^{140}_{58}Ce$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	82.679	74.655	84.174	68.749	33.135	44.609
.60	88.529	81.166	90.642	75.804	36.157	47.087
.80	90.379	84.020	93.592	79.404	38.235	49.252
1.00	90.586	85.035	94.684	81.182	39.747	50.952
1.20	90.178	85.079	94.720	81.890	40.882	52.244
1.40	89.577	84.625	94.149	81.945	41.747	53.208
1.60	88.972	83.943	93.243	81.598	42.413	53.911
1.80	88.472	83.189	92.171	81.013	42.925	54.406
2.00	88.090	82.450	91.040	80.295	43.315	54.736
3.00	86.819	79.779	86.081	76.497	44.107	54.824
4.00	84.166	78.011	82.866	73.689	43.847	53.614
5.00	80.789	75.752	80.348	71.643	43.105	51.941
6.00	78.835	72.896	77.657	69.682	42.134	50.146
7.00	76.093	70.318	74.651	67.482	41.064	48.382
8.00	73.928	68.588	71.710	65.103	39.965	46.715
9.00	71.873	66.467	69.307	62.828	38.877	45.168
10.00	69.928	64.597	67.517	60.943	37.822	43.746
20.00	55.225	50.994	51.993	47.765	30.399	35.265
40.00	39.351	36.290	36.221	33.695	22.821	25.621
60.00	30.750	28.335	27.950	26.173	18.303	20.266
80.00	25.299	23.300	22.812	21.454	15.283	16.843
100.00	21.525	19.818	19.304	18.209	13.261	14.435

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	101.279	89.869	89.784	89.297	87.937	90.177
.60	104.967	94.772	94.781	94.339	93.103	95.167
.80	105.341	95.932	96.046	95.638	94.497	96.467
1.00	104.721	95.740	95.814	95.434	94.368	96.230
1.20	104.029	95.074	95.058	94.699	93.695	95.413
1.40	103.545	94.358	94.182	93.841	92.685	94.470
1.60	103.291	93.767	93.361	93.034	92.118	93.552
1.80	103.181	93.335	92.687	92.371	91.488	92.765
2.00	103.097	93.033	92.162	91.856	91.000	92.130
3.00	100.556	91.610	90.428	90.154	89.387	90.138
4.00	96.447	88.120	87.439	87.189	86.490	87.345
5.00	93.451	85.013	83.781	83.552	82.911	83.614
6.00	90.597	82.407	81.645	81.430	80.826	81.135
7.00	87.867	79.919	78.725	78.523	77.957	78.399
8.00	85.283	77.606	76.422	76.230	75.693	76.089
9.00	82.846	75.418	74.245	74.062	73.551	73.909
10.00	80.549	73.351	72.192	72.017	71.529	71.853
20.00	63.395	57.823	56.817	56.694	56.350	56.496
40.00	45.070	41.150	40.375	40.295	40.074	40.111
60.00	35.182	32.136	31.507	31.448	31.285	31.287
80.00	28.925	26.429	25.899	25.852	25.723	25.710
100.00	24.594	22.478	22.020	21.981	21.874	21.855

$^{142}_{60}Nd$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	84.839	76.800	86.724	70.834	34.144	45.984
.60	90.909	83.559	93.463	78.165	37.277	48.568
.80	92.860	86.548	96.568	81.931	39.440	50.831
1.00	93.116	87.635	97.749	83.811	41.020	52.614
1.20	92.733	87.715	97.831	84.582	42.210	53.975
1.40	92.151	87.278	97.280	84.673	43.122	54.997
1.60	91.564	86.603	96.377	84.345	43.827	55.747
1.80	91.086	85.852	95.300	83.767	44.373	56.283
2.00	90.729	85.116	94.161	83.050	44.793	56.645
3.00	89.600	82.490	89.160	79.230	45.684	56.829
4.00	86.997	80.791	85.958	76.425	45.473	55.645
5.00	83.608	78.556	83.465	74.404	44.751	53.964
6.00	81.695	75.673	80.767	72.457	43.784	52.145
7.00	78.933	73.065	77.717	70.241	42.706	50.350
8.00	76.765	71.343	74.718	67.823	41.593	48.648
9.00	74.701	69.195	72.276	65.503	40.487	47.069
10.00	72.742	67.301	70.475	63.507	39.412	45.615
20.00	57.810	53.450	54.595	50.136	31.824	36.969
40.00	41.480	38.291	38.283	35.598	24.039	27.023
60.00	32.544	30.011	29.648	27.753	19.351	21.453
80.00	26.846	24.741	24.254	22.802	16.198	17.874
100.00	22.883	21.080	20.556	19.385	14.081	15.346

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	103.736	92.158	92.129	91.630	90.234	92.561
.60	107.588	97.256	97.329	96.875	95.606	97.756
.80	108.029	98.501	98.682	98.263	97.091	99.146
1.00	107.444	98.348	98.490	98.098	97.003	98.949
1.20	106.783	97.706	97.752	97.383	96.350	98.148
1.40	106.337	97.010	96.889	96.538	95.555	97.215
1.60	106.128	96.442	96.082	95.745	94.803	96.306
1.80	106.067	96.038	95.425	95.100	94.191	95.532
2.00	106.034	95.770	94.923	94.608	93.726	94.915
3.00	103.628	94.499	93.324	93.041	92.249	93.045
4.00	99.544	91.035	90.380	90.122	89.399	90.305
5.00	96.591	87.942	86.705	86.468	85.804	86.552
6.00	93.761	85.352	84.607	84.383	83.757	84.091
7.00	91.041	82.868	81.663	81.453	80.866	81.341
8.00	88.456	80.552	79.354	79.155	78.598	79.024
9.00	86.011	78.355	77.166	76.976	76.445	76.831
10.00	83.700	76.274	75.097	74.915	74.408	74.759
20.00	66.303	60.511	59.477	59.348	58.988	59.149
40.00	47.476	43.366	42.559	42.476	42.243	42.286
60.00	37.215	34.005	33.345	33.283	33.110	33.115
80.00	30.679	28.040	27.482	27.433	27.295	27.284
100.00	26.134	23.894	23.409	23.368	23.254	23.235

$^{160}_{64}Gd$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	89.120	81.053	91.786	74.974	36.149	48.716
.60	95.620	88.305	99.063	82.852	39.503	51.511
.80	97.770	91.560	102.477	86.947	41.835	53.969
1.00	98.119	92.788	103.832	89.032	43.549	55.917
1.20	97.787	92.940	104.006	89.927	44.849	57.417
1.40	97.240	92.536	103.494	90.089	45.855	58.554
1.60	96.688	91.874	102.600	89.799	46.639	59.400
1.80	96.251	91.129	101.513	89.237	47.253	60.015
2.00	95.944	90.397	100.354	88.521	47.732	60.445
3.00	95.099	87.865	95.275	84.658	48.823	60.821
4.00	92.602	86.309	92.105	81.864	48.712	59.692
5.00	89.193	84.128	89.669	79.899	48.033	57.998
6.00	87.366	81.194	86.968	77.986	47.075	56.134
7.00	84.570	78.533	83.835	75.747	45.984	54.279
8.00	82.402	76.831	80.725	73.254	44.845	52.512
9.00	80.325	74.632	78.211	70.849	43.705	50.868
10.00	78.344	72.699	76.394	68.876	42.591	49.354
20.00	62.997	58.391	59.847	54.918	34.688	40.399
40.00	45.800	42.360	42.489	39.478	26.509	29.874
60.00	36.210	33.444	33.136	30.995	21.489	23.882
80.00	30.022	27.703	27.220	25.582	18.074	19.993
100.00	25.682	23.685	23.150	21.817	15.769	17.224

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	108.603	96.693	96.777	96.253	94.787	97.286
.60	112.774	102.174	102.373	101.896	100.561	102.882
.80	113.342	103.582	103.900	103.459	102.225	104.450
1.00	112.822	103.506	103.782	103.370	102.216	104.327
1.20	112.220	102.906	103.080	102.690	101.601	103.557
1.40	111.847	102.248	102.240	101.869	100.832	102.643
1.60	111.727	101.726	101.458	101.102	100.108	101.751
1.80	111.764	101.379	100.837	100.494	99.533	101.003
2.00	111.830	101.176	100.380	100.046	99.114	100.421
3.00	109.696	100.211	99.052	98.751	97.911	98.797
4.00	105.663	96.801	96.203	95.928	95.159	96.169
5.00	102.800	93.741	92.496	92.243	91.536	92.375
6.00	100.024	91.189	90.481	90.241	89.572	89.957
7.00	97.329	88.718	87.496	87.271	86.642	87.183
8.00	94.749	86.403	85.182	84.968	84.370	84.858
9.00	92.293	84.193	82.976	82.772	82.201	82.645
10.00	89.962	82.090	80.880	80.685	80.138	80.544
20.00	72.127	65.901	64.813	64.673	64.280	64.475
40.00	52.350	47.860	46.991	46.899	46.641	46.700
60.00	41.361	37.821	37.101	37.032	36.839	36.851
80.00	34.278	31.348	30.733	30.678	30.524	30.516
100.00	29.312	26.810	26.273	26.227	26.100	26.081

168.
68. Er IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	93.350	85.262	96.800	79.075	38.139	51.427
.60	100.273	92.999	104.611	87.495	41.712	54.430
.80	102.616	96.515	108.330	91.917	44.210	57.081
1.00	103.054	97.883	109.858	94.203	46.057	59.194
1.20	102.769	98.104	110.122	95.221	47.468	60.832
1.40	102.255	97.732	109.650	95.455	48.566	62.084
1.60	101.735	97.082	108.763	95.202	49.429	63.027
1.80	101.339	96.341	107.666	94.655	50.112	63.722
2.00	101.082	95.614	106.488	93.941	50.650	64.218
3.00	100.521	93.177	101.334	90.037	51.942	64.790
4.00	98.134	91.771	98.203	87.260	51.934	63.719
5.00	94.709	89.650	95.836	85.358	51.301	62.017
6.00	92.976	86.673	93.139	83.487	50.354	60.111
7.00	90.152	83.964	89.931	81.232	49.253	58.198
8.00	87.991	82.290	86.717	78.672	48.090	56.370
9.00	85.908	80.046	84.137	76.185	46.918	54.664
10.00	83.910	78.079	82.313	74.162	45.767	53.092
20.00	68.200	63.363	65.151	59.745	37.568	43.855
40.00	50.190	46.508	46.794	43.446	29.020	32.779
60.00	39.968	36.973	36.737	34.539	23.679	26.376
80.00	33.300	30.769	30.321	28.467	20.007	22.183
100.00	28.587	26.393	25.856	24.353	17.516	19.175

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	113.410	101.175	101.371	100.822	99.286	101.957
.60	117.889	107.028	107.355	106.855	105.455	107.945
.80	118.576	108.594	109.050	108.587	107.291	109.685
1.00	118.115	108.589	109.002	108.569	107.356	109.634
1.20	117.569	108.028	108.331	107.922	106.777	108.692
1.40	117.266	107.405	107.512	107.123	106.032	107.992
1.60	117.232	106.927	106.755	106.381	105.334	107.116
1.80	117.367	106.635	106.167	105.806	104.795	106.393
2.00	117.530	106.497	105.754	105.403	104.421	105.846
3.00	115.667	105.839	104.699	104.382	103.494	104.470
4.00	111.688	102.488	101.950	101.659	100.844	101.959
5.00	108.921	99.465	98.217	97.948	97.197	98.129
6.00	106.206	96.958	96.290	96.036	95.324	95.761
7.00	103.542	94.506	93.271	93.031	92.360	92.970
8.00	100.973	92.199	90.959	90.730	90.092	90.644
9.00	98.515	89.982	88.743	88.524	87.914	88.418
10.00	96.170	87.863	86.627	86.418	85.832	86.295
20.00	77.956	71.303	70.166	70.014	69.590	69.820
40.00	57.294	52.424	51.495	51.394	51.112	51.188
60.00	45.606	41.732	40.952	40.876	40.663	40.684
80.00	37.987	34.761	34.089	34.028	33.857	33.854
100.00	32.602	29.834	29.244	29.194	29.051	29.035

184.
74. W IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	99.612	91.499	104.241	85.162	41.098	55.457
.60	107.154	99.951	112.842	94.385	44.996	58.770
.80	109.774	103.853	117.013	99.290	47.740	61.708
1.00	110.338	105.424	118.797	101.876	49.785	64.065
1.20	110.118	105.746	119.194	103.076	51.359	65.909
1.40	109.649	105.417	118.779	103.416	52.595	67.332
1.60	109.176	104.783	117.903	103.217	53.577	68.419
1.80	108.839	104.048	116.790	102.692	54.362	69.235
2.00	108.654	103.327	115.583	101.980	54.989	69.832
3.00	108.521	101.036	110.320	98.018	56.586	70.702
4.00	106.305	99.863	107.260	95.273	56.735	69.725
5.00	102.863	97.845	105.011	93.479	56.176	68.015
6.00	101.282	94.809	102.336	91.685	55.250	66.050
7.00	98.424	92.038	99.028	89.416	54.138	64.056
8.00	96.283	90.418	95.667	86.764	52.942	62.138
9.00	94.201	88.117	93.001	84.165	51.725	60.345
10.00	92.191	86.109	91.181	82.076	50.523	58.690
20.00	76.022	70.865	73.186	67.052	41.908	49.078
40.00	56.887	52.857	53.414	49.542	32.851	37.226
60.00	45.761	42.429	42.330	39.527	27.050	30.229
80.00	38.391	35.543	35.155	32.975	23.001	25.589
100.00	33.123	30.634	30.112	28.337	20.238	22.225

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	120.518	107.806	108.171	107.585	105.946	108.872
.60	125.441	114.202	114.722	114.187	112.691	115.433
.80	126.296	115.994	116.658	116.162	114.776	117.421
1.00	125.914	116.088	116.707	116.243	114.945	117.469
1.20	125.444	115.579	116.078	115.640	114.413	116.764
1.40	125.239	115.005	115.287	114.869	113.700	115.884
1.60	125.332	114.589	114.563	114.161	113.033	115.077
1.80	125.609	114.377	114.024	113.636	112.550	114.[illegible]
2.00	125.917	114.335	113.677	113.299	112.243	113.[illegible]
3.00	124.458	114.139	113.032	112.690	111.731	112.844
4.00	120.563	110.878	110.439	110.123	109.241	110.[illegible]
5.00	117.948	107.919	106.673	106.381	105.565	106.637
6.00	115.333	105.488	104.892	104.615	103.839	104.355
7.00	112.728	103.076	101.829	101.567	100.835	101.548
8.00	110.187	100.791	99.531	99.281	98.582	99.233
9.00	107.736	98.577	97.310	97.071	96.401	96.999
10.00	105.382	96.445	95.176	94.946	94.302	94.854
20.00	86.697	79.417	78.214	78.044	77.571	77.858
40.00	64.816	59.381	58.367	58.253	57.933	58.037
60.00	52.132	47.754	46.887	46.800	46.556	46.593
80.00	43.733	40.056	39.300	39.230	39.033	39.038
100.00	37.730	34.555	33.885	33.826	33.662	33.649

$^{202}_{80}Hg$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	105.782	97.652	111.593	91.174	44.029	59.448
.60	113.926	106.807	120.973	101.191	48.246	63.065
.80	116.813	111.085	125.590	106.573	51.234	66.284
1.00	117.496	112.853	127.624	109.465	53.474	68.886
1.20	117.333	113.272	128.153	110.835	55.210	70.934
1.40	116.905	112.983	127.793	111.277	56.583	72.529
1.60	116.474	112.363	126.926	111.132	57.683	73.759
1.80	116.193	111.632	125.795	110.628	58.569	74.696
2.00	116.079	110.916	124.560	109.917	59.285	75.394
3.00	116.375	108.471	119.190	105.896	61.189	76.565
4.00	114.334	107.842	116.213	103.192	61.499	75.688
5.00	110.880	105.936	114.097	101.518	61.018	73.975
6.00	109.463	102.850	111.460	99.814	60.117	71.957
7.00	106.579	100.025	108.062	97.545	58.997	69.885
8.00	104.470	98.474	104.565	94.810	57.773	67.883
9.00	102.400	96.125	101.825	92.107	56.515	66.006
10.00	100.386	94.087	100.025	89.961	55.265	64.272
20.00	83.849	78.401	81.293	74.419	46.264	54.334
40.00	63.695	59.336	60.203	55.785	36.747	41.763
60.00	51.714	48.055	48.127	44.898	30.510	34.199
80.00	43.666	40.506	40.207	37.672	26.097	29.125
100.00	37.855	35.070	34.586	32.520	23.069	25.411

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	127.518	114.338	114.872	114.250	112.509	115.685
.60	132.864	121.261	121.972	121.403	119.813	122.805
.80	133.872	123.265	124.138	123.611	122.136	125.031
1.00	133.561	123.450	124.278	123.784	122.402	125.170
1.20	133.157	122.987	123.684	123.217	121.910	124.496
1.40	133.047	122.455	122.916	122.470	121.224	123.631
1.60	133.260	122.098	122.221	121.792	120.594	122.793
1.80	133.677	121.964	121.729	121.314	120.155	122.136
2.00	134.127	122.016	121.445	121.042	119.914	121.690
3.00	133.070	122.280	121.213	120.845	119.817	121.064
4.00	129.260	119.114	118.780	118.441	117.491	118.926
5.00	126.804	116.226	114.987	114.673	113.793	115.008
6.00	124.299	113.881	113.364	113.065	112.226	112.822
7.00	121.762	111.519	110.266	109.983	109.190	110.009
8.00	119.261	109.266	107.993	107.722	106.964	107.716
9.00	116.827	107.065	105.779	105.519	104.791	105.484
10.00	114.475	104.931	103.637	103.386	102.686	103.328
20.00	95.419	87.529	86.267	86.080	85.558	85.906
40.00	72.443	66.446	65.352	65.224	64.866	65.002
60.00	58.822	53.937	52.987	52.888	52.613	52.668
80.00	49.675	45.538	44.700	44.620	44.396	44.412
100.00	43.068	39.475	38.726	38.658	38.470	38.463

$^{238}_{92}U$ IONS

ELECTRONIC STOPPING POWER MEV/(MG/SQ CM)

MEV/AMU	(CH2)N	FORMVAR	MYLAR	VYNS	HAVAR	ARGON
.40	117.683	109.737	126.060	103.011	49.818	67.323
.60	127.185	120.163	136.967	114.501	54.659	71.537
.80	130.579	125.271	142.457	120.699	58.123	75.315
1.00	131.474	127.417	144.982	124.360	60.748	78.393
1.20	131.412	128.015	145.763	126.090	62.804	80.845
1.40	131.051	127.793	145.505	126.733	64.448	82.780
1.60	130.695	127.196	144.651	126.689	65.781	84.296
1.80	130.518	126.467	143.483	126.223	66.869	85.473
2.00	130.540	125.756	142.185	125.511	67.762	86.374
3.00	131.690	123.901	136.603	121.369	70.281	88.156
4.00	130.008	123.479	133.815	118.761	70.922	87.488
5.00	126.541	121.823	132.005	117.355	70.605	85.780
6.00	125.476	118.657	129.478	115.865	69.765	83.665
7.00	122.560	115.745	125.932	113.622	68.638	81.449
8.00	120.538	114.360	122.185	110.744	67.366	79.288
9.00	118.517	111.939	119.326	107.854	66.033	77.253
10.00	116.523	109.864	117.604	105.620	64.694	75.372
20.00	99.473	93.518	97.648	89.264	54.990	64.906
40.00	77.557	72.593	74.187	68.629	44.689	51.047
60.00	64.010	59.733	60.242	56.104	37.649	42.408
80.00	54.681	50.916	50.877	47.599	32.544	36.531
100.00	47.822	44.456	44.115	41.414	29.013	32.146

MEV/AMU	METHANE	BUTANE	ETHYLENE	PROPYLENE	BUTENE	PENTANE
.40	141.230	127.144	128.013	127.319	125.380	129.051
.60	147.373	135.073	146.169	135.534	133.759	137.243
.80	148.652	137.474	138.767	138.178	136.529	139.918
1.00	148.453	137.815	139.064	138.511	136.965	140.219
1.20	148.164	137.427	138.526	138.002	136.539	139.590
1.40	148.225	136.967	137.790	137.291	135.893	138.742
1.60	148.671	136.716	137.144	136.663	135.318	137.930
1.80	149.357	136.730	136.736	136.271	134.968	137.330
2.00	150.086	136.964	136.575	136.122	134.853	136.978
3.00	149.817	138.144	137.164	136.748	135.584	137.102
4.00	146.178	135.170	135.064	134.678	133.599	135.357
5.00	144.054	132.438	131.229	130.870	129.865	131.368
6.00	141.789	130.285	129.948	129.605	128.644	129.400
7.00	139.413	128.045	126.801	126.475	125.563	126.598
8.00	137.016	125.883	124.604	124.291	123.416	124.374
9.00	134.644	123.732	122.428	122.127	121.284	122.175
10.00	132.322	121.620	120.296	120.005	119.192	120.023
20.00	112.768	103.701	102.341	102.119	101.500	101.979
40.00	87.917	80.815	79.575	79.419	78.982	79.193
60.00	72.594	66.694	65.585	65.463	65.122	65.223
80.00	62.041	56.974	55.976	55.876	55.596	55.640
100.00	54.278	49.828	48.922	48.837	48.599	48.610