

## Activation of Th-232 target using FLUKA simulation code

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## Activation of Th-232 target using FLUKA simulation code

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FLUKA is a general-purpose Monte Carlo simulation code used to model the interaction and transport of particles from a few KeV to thousands of TeV in arbitrary materials. It is built and maintained with the aim of including the best possible physical models in terms of completeness and precision [1]. In this study, we are using the USRBDX card to get the energy spectrum (photons/sec), RESNUCLEi card to score the residual isotopes and activities and USRBIN card to calculate the dose rate from the Thorium target irradiated in the BLIP.

For the simulation, we used 2.385-inch dia. and 0.014-inch thickness of Th-232 ( $11.72 \text{ g/cm}^3$ ) target. The Th target canned in 2.750-inch dia. and 0.785-inch Inconel 625 ( $8.43 \text{ g/cm}^3$ ) (Appendix A). The front and back windows thickness are 0.013 and 0.758-inch. The BLIP proton beam energy range is 191 MeV and the beam current are  $165 \mu\text{A}$  ( $1.03125\text{E}+15$  protons/s) in Fig. 1. The total activity from Th-232 target is  $4.97302005\text{E}+12$  Bq and from the Inconel 625 housing is  $2.9842699\text{E}+12$  Bq at cooling in 1 second. The 10 KeV energy bin data from 0 to 5 MeV and 1 MeV energy bin data from 5 MeV to 15 MeV is shown in Fig. 2 and 3 respectively with the corresponding the data file given the Appendix B and C. The amount of the produced Ac-225 from Th-232 target is  $7.669\text{E}+09$  at EOB. The results with more than 10% statistical error are not reliable due to poor statistics. Only radionuclide with activity greater than  $1.\text{E}-09$  of the total activity are listed on Appendix D. Also, the dose rates profile with and without Inconel 625 housing is given in Fig. 4 and 5.

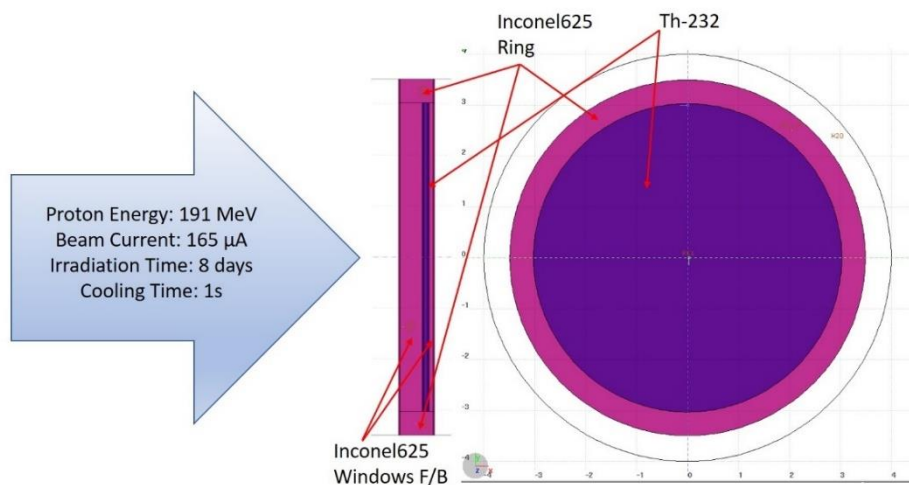


Figure 1. FLUKA simulation geometry and the proton beam information

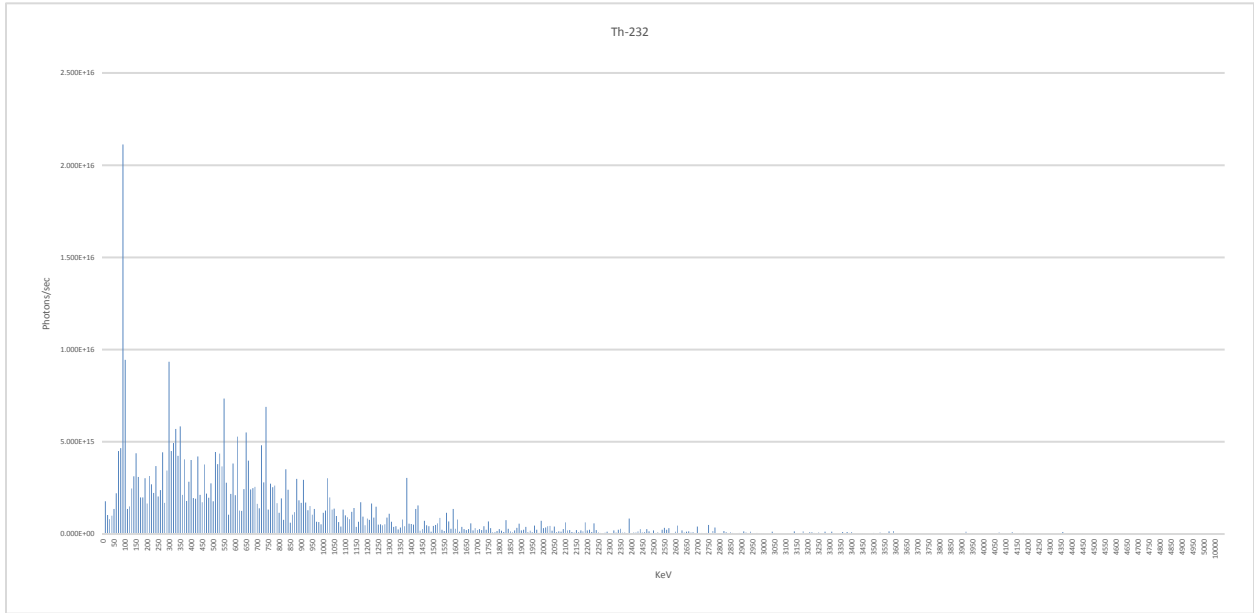


Figure 2. Energy spectrum from Th-232 target only (Appendix B)

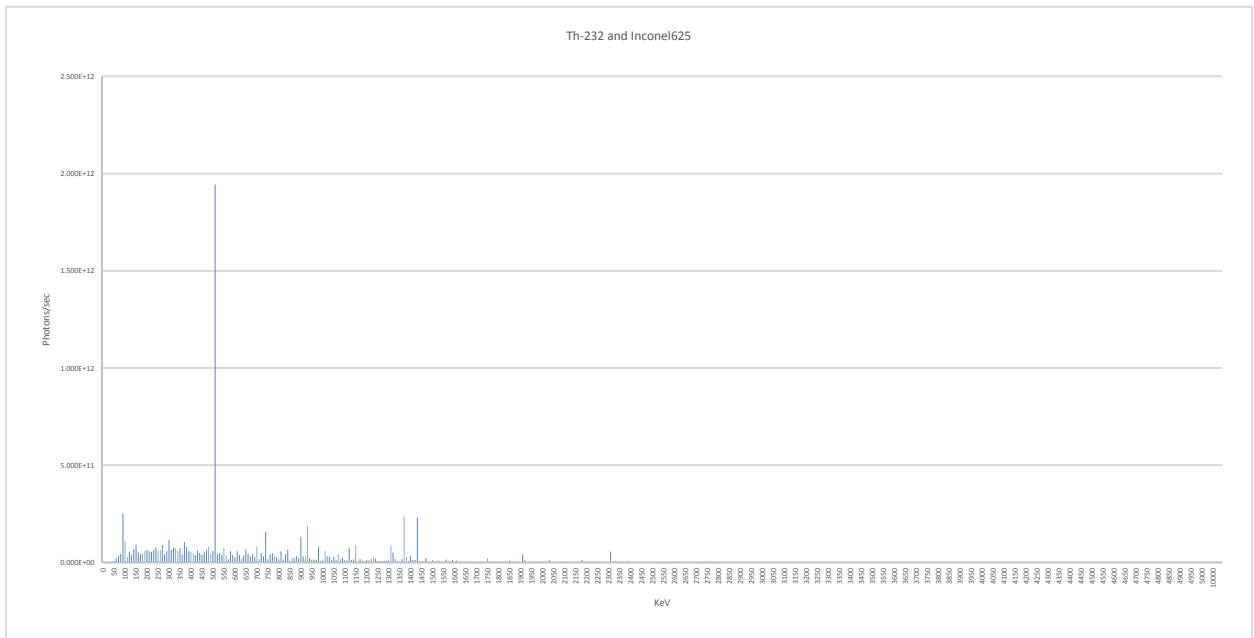


Figure 3. Energy spectrum from Th-232 and Inconel 625 (Appendix C)

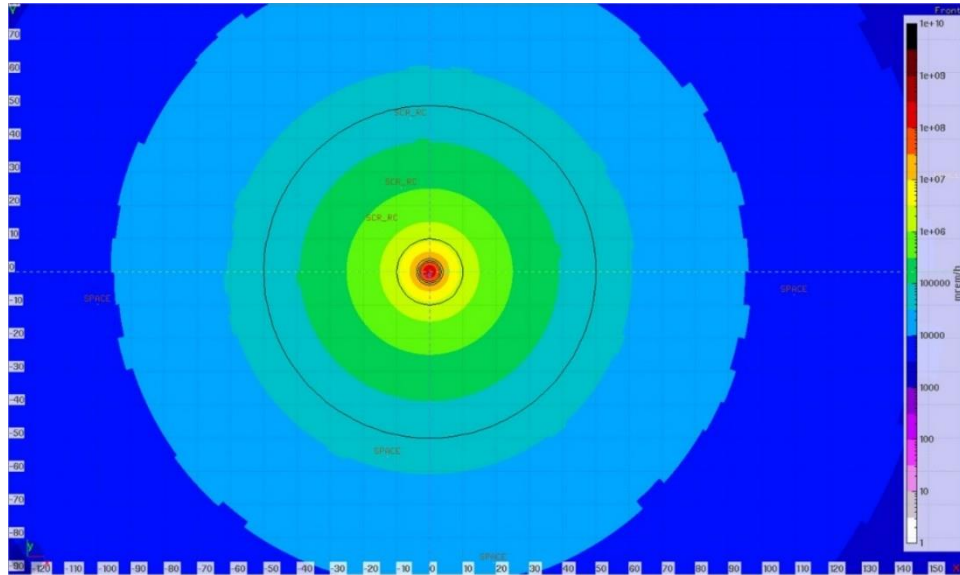


Figure 4. The dose rates profile from the Th-232 target only

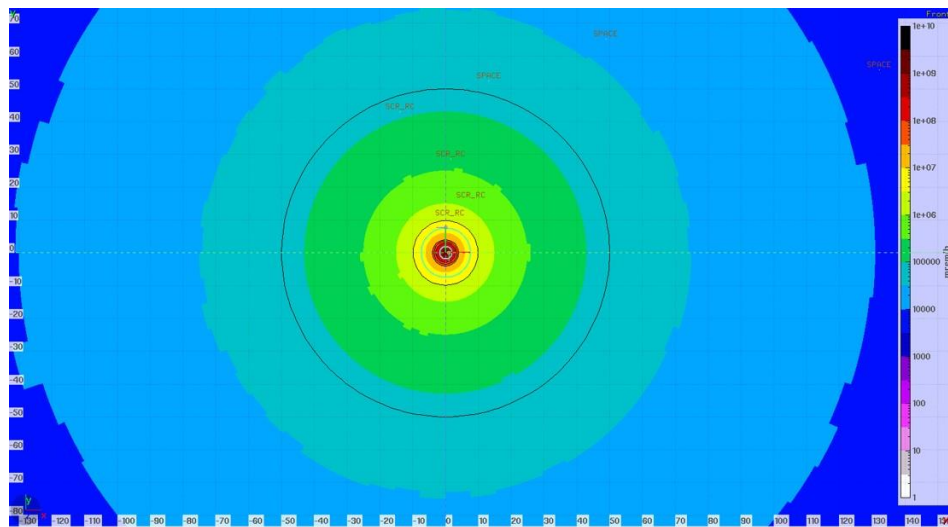


Figure 5. The dose rates profile from the Th-232 target with Inconel 625 housing

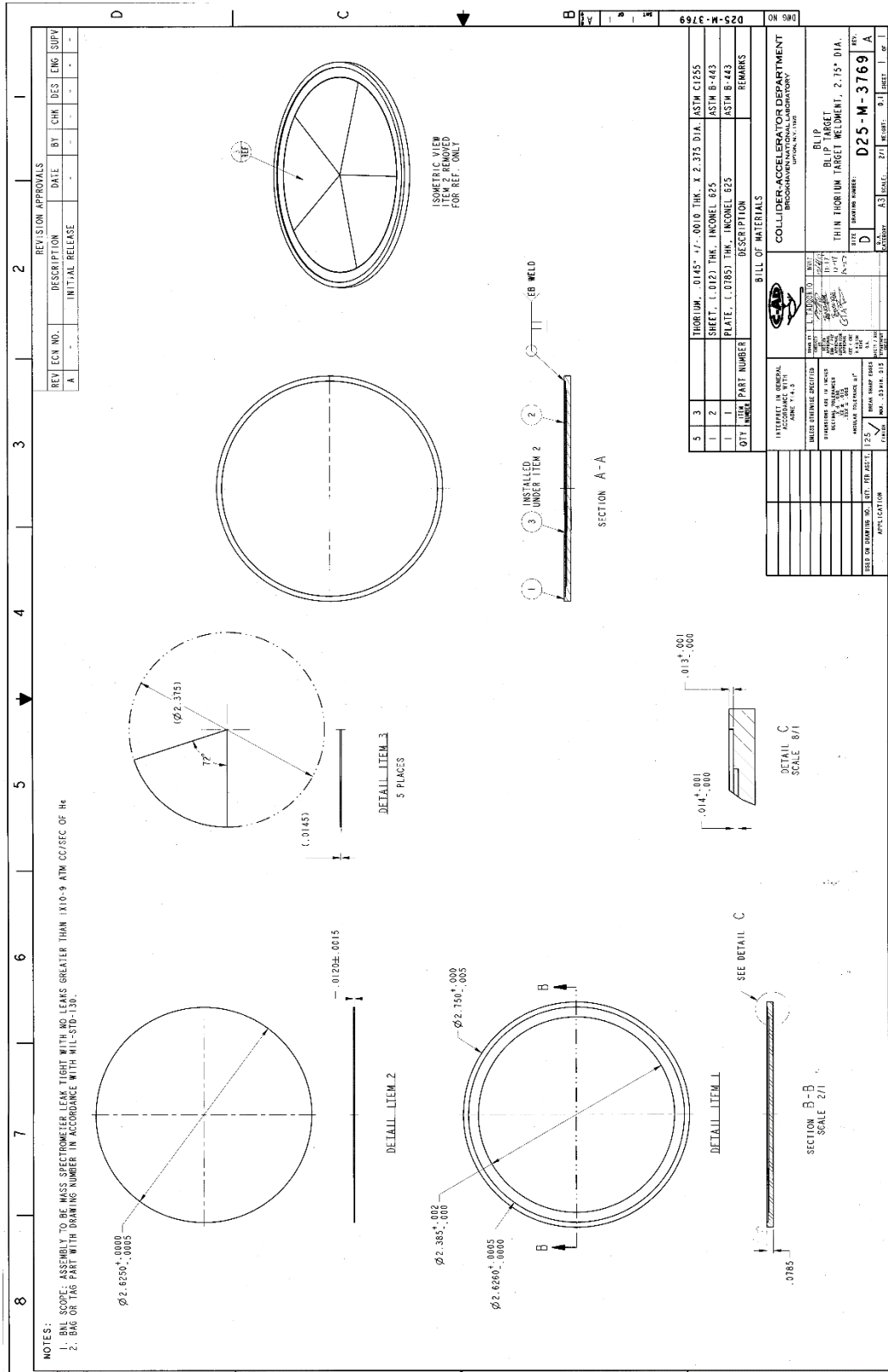
## References

[1] Giuseppe Battistoni et al. Overview of the FLULA code. Annals of Nuclear Energy. 2015 Aug. Vol 82, Pages 10-18.

## Acknowledgments

This research supported by the Department of Energy Office of Science's Isotope Program.

Appendix A



Appendix B

Th target

E1 (keV)	E2 (keV)	Ph/s	err (%)
0	10	0.000E+00	0.000E+00
10	20	1.782E+15	1.541E-01
20	30	1.033E+15	2.628E-01
30	40	8.024E+14	1.754E-01
40	50	1.003E+15	1.567E-01
50	60	1.353E+15	1.394E-01
60	70	2.205E+15	1.187E-01
70	80	4.504E+15	9.081E-02
80	90	4.658E+15	7.394E-02
90	100	2.112E+16	5.400E-02
100	110	9.451E+15	6.219E-02
110	120	1.366E+15	1.351E-01
120	130	1.501E+15	1.196E-01
130	140	2.468E+15	1.107E-01
140	150	3.133E+15	1.106E-01
150	160	4.378E+15	1.036E-01
160	170	3.089E+15	1.050E-01
170	180	1.992E+15	1.058E-01
180	190	1.980E+15	1.177E-01
190	200	3.025E+15	1.056E-01
200	210	1.660E+15	1.320E-01
210	220	3.151E+15	1.106E-01
220	230	2.703E+15	1.134E-01
230	240	2.235E+15	1.123E-01
240	250	3.684E+15	1.177E-01
250	260	2.034E+15	1.096E-01
260	270	2.377E+15	1.127E-01
270	280	4.428E+15	1.074E-01
280	290	1.686E+15	1.444E-01
290	300	3.450E+15	9.697E-02
300	310	9.349E+15	9.725E-02
310	320	4.502E+15	9.290E-02
320	330	4.935E+15	1.017E-01
330	340	5.694E+15	1.004E-01
340	350	4.239E+15	9.613E-02
350	360	5.829E+15	1.149E-01
360	370	2.130E+15	1.247E-01
370	380	4.048E+15	1.463E-01
380	390	1.798E+15	1.253E-01

390	400	2.830E+15	1.263E-01
400	410	4.019E+15	1.235E-01
410	420	1.950E+15	1.373E-01
420	430	1.923E+15	1.370E-01
430	440	4.213E+15	1.233E-01
440	450	2.130E+15	1.284E-01
450	460	1.728E+15	1.385E-01
460	470	3.765E+15	1.185E-01
470	480	2.184E+15	1.228E-01
480	490	1.962E+15	1.618E-01
490	500	2.741E+15	9.811E-02
500	510	1.783E+15	1.351E-01
510	520	4.441E+15	1.299E-01
520	530	3.784E+15	1.103E-01
530	540	4.353E+15	1.238E-01
540	550	3.660E+15	1.242E-01
550	560	7.353E+15	1.017E-01
560	570	2.778E+15	1.359E-01
570	580	1.041E+15	1.526E-01
580	590	2.179E+15	1.251E-01
590	600	3.823E+15	1.505E-01
600	610	2.108E+15	1.208E-01
610	620	5.273E+15	1.132E-01
620	630	1.281E+15	1.570E-01
630	640	1.258E+15	1.335E-01
640	650	2.428E+15	1.322E-01
650	660	5.499E+15	1.283E-01
660	670	3.984E+15	1.343E-01
670	680	2.413E+15	1.371E-01
680	690	2.493E+15	1.261E-01
690	700	2.561E+15	1.321E-01
700	710	1.634E+15	1.490E-01
710	720	1.402E+15	1.593E-01
720	730	4.809E+15	1.040E-01
730	740	2.805E+15	1.302E-01
740	750	6.898E+15	1.545E-01
750	760	1.320E+15	2.324E-01
760	770	2.725E+15	1.417E-01
770	780	2.534E+15	1.881E-01
780	790	2.626E+15	1.458E-01
790	800	1.670E+15	1.893E-01
800	810	1.153E+15	1.629E-01
810	820	1.933E+15	1.325E-01



820	830	7.746E+14	1.759E-01
830	840	3.507E+15	1.383E-01
840	850	2.399E+15	1.678E-01
850	860	6.115E+14	1.919E-01
860	870	1.039E+15	1.526E-01
870	880	1.194E+15	1.828E-01
880	890	2.996E+15	1.458E-01
890	900	1.827E+15	1.454E-01
900	910	1.687E+15	1.474E-01
910	920	2.935E+15	1.366E-01
920	930	1.705E+15	1.661E-01
930	940	1.292E+15	1.431E-01
940	950	1.514E+15	1.540E-01
950	960	1.048E+15	1.614E-01
960	970	1.367E+15	1.738E-01
970	980	6.622E+14	2.220E-01
980	990	6.464E+14	2.045E-01
990	1000	5.274E+14	2.442E-01
1000	1010	1.155E+15	1.952E-01
1010	1020	1.270E+15	1.764E-01
1020	1030	3.017E+15	1.209E-01
1030	1040	1.980E+15	1.787E-01
1040	1050	1.325E+15	1.526E-01
1050	1060	1.374E+15	1.948E-01
1060	1070	9.861E+14	1.509E-01
1070	1080	6.427E+14	2.166E-01
1080	1090	3.998E+14	2.517E-01
1090	1100	1.328E+15	1.993E-01
1100	1110	1.018E+15	1.677E-01
1110	1120	9.096E+14	2.086E-01
1120	1130	7.956E+14	1.831E-01
1130	1140	1.200E+15	2.093E-01
1140	1150	1.412E+15	1.980E-01
1150	1160	3.821E+14	2.431E-01
1160	1170	6.692E+14	2.020E-01
1170	1180	1.732E+15	2.007E-01
1180	1190	9.457E+14	2.868E-01
1190	1200	4.661E+14	2.129E-01
1200	1210	8.325E+14	1.842E-01
1210	1220	7.644E+14	1.999E-01
1220	1230	1.662E+15	1.916E-01
1230	1240	8.955E+14	1.549E-01
1240	1250	1.480E+15	1.988E-01

1250	1260	5.042E+14	2.534E-01
1260	1270	5.248E+14	2.566E-01
1270	1280	4.768E+14	2.783E-01
1280	1290	5.331E+14	2.292E-01
1290	1300	8.906E+14	2.361E-01
1300	1310	1.104E+15	1.524E-01
1310	1320	6.720E+14	2.507E-01
1320	1330	3.908E+14	2.765E-01
1330	1340	4.253E+14	2.336E-01
1340	1350	2.506E+14	2.935E-01
1350	1360	3.502E+14	2.581E-01
1360	1370	7.855E+14	1.990E-01
1370	1380	4.229E+14	2.459E-01
1380	1390	3.050E+15	1.733E-01
1390	1400	5.585E+14	1.904E-01
1400	1410	5.521E+14	2.057E-01
1410	1420	5.092E+14	2.569E-01
1420	1430	1.364E+15	2.705E-01
1430	1440	1.557E+15	1.895E-01
1440	1450	1.827E+14	3.450E-01
1450	1460	2.697E+14	2.867E-01
1460	1470	7.191E+14	2.535E-01
1470	1480	4.671E+14	2.244E-01
1480	1490	4.160E+14	3.384E-01
1490	1500	1.359E+14	4.231E-01
1500	1510	4.428E+14	2.346E-01
1510	1520	4.867E+14	2.370E-01
1520	1530	5.812E+14	2.319E-01
1530	1540	8.803E+14	2.106E-01
1540	1550	2.395E+14	3.182E-01
1550	1560	1.674E+14	3.580E-01
1560	1570	1.150E+15	2.466E-01
1570	1580	6.907E+14	2.021E-01
1580	1590	2.856E+14	3.133E-01
1590	1600	1.364E+15	1.903E-01
1600	1610	2.848E+14	2.870E-01
1610	1620	7.797E+14	1.805E-01
1620	1630	1.200E+14	5.207E-01
1630	1640	3.889E+14	2.717E-01
1640	1650	2.730E+14	3.095E-01
1650	1660	2.132E+14	3.008E-01
1660	1670	2.599E+14	2.646E-01
1670	1680	5.813E+14	2.359E-01

1680	1690	1.883E+14	3.478E-01
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1720	1730	2.071E+14	3.378E-01
1730	1740	4.166E+14	2.319E-01
1740	1750	2.312E+14	3.157E-01
1750	1760	6.754E+14	2.575E-01
1760	1770	3.174E+14	2.876E-01
1770	1780	1.004E+14	4.689E-01
1780	1790	1.124E+14	4.916E-01
1790	1800	1.693E+14	3.743E-01
1800	1810	2.605E+14	3.002E-01
1810	1820	1.753E+14	3.658E-01
1820	1830	1.078E+14	4.593E-01
1830	1840	7.499E+14	2.313E-01
1840	1850	2.752E+14	2.933E-01
1850	1860	1.485E+14	3.810E-01
1860	1870	9.910E+13	5.507E-01
1870	1880	1.933E+14	3.406E-01
1880	1890	3.280E+14	2.643E-01
1890	1900	5.633E+14	2.182E-01
1900	1910	1.992E+14	3.514E-01
1910	1920	2.264E+14	3.485E-01
1920	1930	3.864E+14	2.799E-01
1930	1940	1.057E+14	4.795E-01
1940	1950	1.808E+14	3.795E-01
1950	1960	9.904E+13	4.801E-01
1960	1970	4.556E+14	2.525E-01
1970	1980	2.242E+14	3.555E-01
1980	1990	6.435E+13	5.436E-01
1990	2000	7.255E+14	1.840E-01
2000	2010	3.197E+14	2.605E-01
2010	2020	3.554E+14	2.893E-01
2020	2030	4.277E+14	2.475E-01
2030	2040	4.326E+14	2.630E-01
2040	2050	1.815E+14	3.732E-01
2050	2060	4.085E+14	2.360E-01
2060	2070	8.680E+13	5.050E-01
2070	2080	1.463E+14	4.335E-01
2080	2090	1.240E+14	4.330E-01
2090	2100	2.604E+14	2.558E-01
2100	2110	6.380E+14	1.919E-01

2110	2120	1.936E+14	3.249E-01
2120	2130	2.089E+14	3.482E-01
2130	2140	1.097E+14	4.332E-01
2140	2150	7.985E+13	5.732E-01
2150	2160	2.148E+14	3.068E-01
2160	2170	9.856E+13	4.842E-01
2170	2180	1.978E+14	3.826E-01
2180	2190	1.449E+14	4.251E-01
2190	2200	6.349E+14	2.329E-01
2200	2210	1.925E+14	4.157E-01
2210	2220	2.363E+14	3.333E-01
2220	2230	1.053E+14	4.120E-01
2230	2240	5.792E+14	2.243E-01
2240	2250	2.087E+14	2.836E-01
2250	2260	8.240E+13	5.480E-01
2260	2270	6.376E+13	6.446E-01
2270	2280	3.944E+13	7.888E-01
2280	2290	6.748E+13	5.493E-01
2290	2300	1.199E+14	4.057E-01
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2310	2320	3.756E+13	7.599E-01
2320	2330	1.998E+14	2.945E-01
2330	2340	8.027E+13	5.229E-01
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2350	2360	2.764E+14	3.462E-01
2360	2370	7.642E+13	5.154E-01
2370	2380	7.704E+13	5.753E-01
2380	2390	4.382E+13	6.727E-01
2390	2400	8.353E+14	2.392E-01
2400	2410	4.466E+13	6.016E-01
2410	2420	7.446E+13	4.938E-01
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2430	2440	1.480E+14	3.963E-01
2440	2450	2.721E+14	4.455E-01
2450	2460	7.950E+13	5.471E-01
2460	2470	9.191E+13	5.112E-01
2470	2480	2.737E+14	3.238E-01
2480	2490	1.445E+14	4.211E-01
2490	2500	5.993E+13	6.168E-01
2500	2510	1.954E+14	3.636E-01
2510	2520	5.592E+13	6.072E-01
2520	2530	8.436E+13	5.033E-01
2530	2540	4.424E+13	7.284E-01

2540	2550	2.345E+14	3.591E-01
2550	2560	3.330E+14	3.779E-01
2560	2570	2.269E+14	3.892E-01
2570	2580	3.201E+14	3.176E-01
2580	2590	3.039E+13	7.927E-01
2590	2600	2.115E+13	1.025E+00
2600	2610	1.231E+14	4.304E-01
2610	2620	4.512E+14	2.784E-01
2620	2630	4.138E+13	7.331E-01
2630	2640	1.990E+14	3.745E-01
2640	2650	7.201E+13	4.958E-01
2650	2660	1.333E+14	5.336E-01
2660	2670	1.484E+14	4.375E-01
2670	2680	8.292E+13	5.568E-01
2680	2690	1.048E+14	4.960E-01
2690	2700	4.496E+13	6.420E-01
2700	2710	4.055E+14	2.615E-01
2710	2720	6.225E+13	6.206E-01
2720	2730	5.903E+13	6.164E-01
2730	2740	4.290E+13	6.597E-01
2740	2750	5.224E+13	5.440E-01
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2760	2770	8.276E+12	1.685E+00
2770	2780	1.577E+14	3.812E-01
2780	2790	3.540E+14	2.849E-01
2790	2800	2.335E+13	9.690E-01
2800	2810	2.028E+13	1.001E+00
2810	2820	2.495E+13	9.748E-01
2820	2830	1.643E+14	3.924E-01
2830	2840	9.601E+13	4.676E-01
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2850	2860	9.135E+13	4.868E-01
2860	2870	5.849E+13	6.671E-01
2870	2880	2.280E+13	1.180E+00
2880	2890	4.296E+13	6.506E-01
2890	2900	5.395E+13	5.919E-01
2900	2910	1.347E+13	1.191E+00
2910	2920	1.485E+14	4.585E-01
2920	2930	6.705E+13	6.602E-01
2930	2940	3.404E+13	9.106E-01
2940	2950	1.254E+14	4.443E-01
2950	2960	2.342E+13	9.806E-01
2960	2970	7.948E+12	1.669E+00

2970	2980	6.080E+13	6.463E-01
2980	2990	3.501E+13	8.116E-01
2990	3000	3.783E+13	8.938E-01
3000	3010	4.369E+13	7.781E-01
3010	3020	1.106E+13	1.476E+00
3020	3030	3.271E+13	8.482E-01
3030	3040	2.368E+13	9.532E-01
3040	3050	1.278E+14	4.623E-01
3050	3060	4.491E+13	7.307E-01
3060	3070	1.540E+13	1.430E+00
3070	3080	9.099E+12	1.646E+00
3080	3090	1.463E+13	1.342E+00
3090	3100	2.906E+13	9.454E-01
3100	3110	1.782E+13	1.185E+00
3110	3120	2.196E+13	1.087E+00
3120	3130	1.573E+13	1.341E+00
3130	3140	1.038E+13	1.534E+00
3140	3150	1.369E+14	5.651E-01
3150	3160	3.543E+12	2.552E+00
3160	3170	9.193E+12	1.699E+00
3170	3180	1.965E+13	1.129E+00
3180	3190	1.386E+14	4.433E-01
3190	3200	1.387E+13	1.146E+00
3200	3210	1.280E+13	1.133E+00
3210	3220	8.669E+13	5.582E-01
3220	3230	9.403E+13	4.532E-01
3230	3240	5.129E+13	6.562E-01
3240	3250	2.865E+13	1.023E+00
3250	3260	7.769E+13	5.893E-01
3260	3270	1.391E+13	1.255E+00
3270	3280	1.625E+13	1.233E+00
3280	3290	1.211E+14	4.049E-01
3290	3300	1.595E+13	1.085E+00
3300	3310	2.490E+13	9.516E-01
3310	3320	1.307E+14	3.771E-01
3320	3330	4.357E+12	2.469E+00
3330	3340	1.025E+13	1.469E+00
3340	3350	1.166E+13	1.581E+00
3350	3360	1.520E+13	1.194E+00
3360	3370	1.109E+14	4.740E-01
3370	3380	4.608E+13	9.749E-01
3380	3390	1.076E+14	4.587E-01
3390	3400	6.625E+13	6.643E-01

3400	3410	8.659E+13	4.524E-01
3410	3420	2.442E+12	3.109E+00
3420	3430	1.170E+12	4.241E+00
3430	3440	6.861E+12	1.903E+00
3440	3450	2.471E+13	1.006E+00
3450	3460	4.509E+13	7.967E-01
3460	3470	1.976E+13	1.128E+00
3470	3480	1.114E+13	1.475E+00
3480	3490	6.293E+12	1.947E+00
3490	3500	3.489E+12	2.770E+00
3500	3510	5.475E+13	6.039E-01
3510	3520	8.438E+12	1.783E+00
3520	3530	2.362E+12	2.983E+00
3530	3540	8.172E+13	5.072E-01
3540	3550	2.380E+13	8.012E-01
3550	3560	3.900E+13	8.829E-01
3560	3570	7.885E+12	1.381E+00
3570	3580	1.466E+14	4.548E-01
3580	3590	6.221E+12	2.003E+00
3590	3600	1.591E+14	4.896E-01
3600	3610	8.617E+12	1.742E+00
3610	3620	2.263E+13	1.046E+00
3620	3630	1.949E+13	1.072E+00
3630	3640	3.246E+13	8.555E-01
3640	3650	1.322E+13	1.390E+00
3650	3660	2.849E+13	1.008E+00
3660	3670	2.402E+13	9.490E-01
3670	3680	7.113E+12	1.746E+00
3680	3690	2.166E+13	1.059E+00
3690	3700	1.011E+12	4.475E+00
3700	3710	2.839E+12	2.901E+00
3710	3720	1.515E+13	1.242E+00
3720	3730	3.227E+12	2.543E+00
3730	3740	1.145E+13	1.554E+00
3740	3750	1.653E+13	1.195E+00
3750	3760	1.056E+12	4.315E+00
3760	3770	3.369E+12	2.208E+00
3770	3780	2.197E+13	1.079E+00
3780	3790	2.979E+12	2.881E+00
3790	3800	9.151E+12	1.622E+00
3800	3810	2.374E+13	1.078E+00
3810	3820	1.508E+13	1.223E+00
3820	3830	1.362E+13	1.330E+00

3830	3840	1.457E+13	1.323E+00
3840	3850	1.762E+13	1.232E+00
3850	3860	3.317E+12	2.829E+00
3860	3870	2.476E+13	1.002E+00
3870	3880	2.857E+12	2.885E+00
3880	3890	7.852E+12	1.649E+00
3890	3900	2.649E+12	3.138E+00
3900	3910	3.645E+12	2.560E+00
3910	3920	3.122E+13	8.195E-01
3920	3930	1.313E+14	4.477E-01
3930	3940	1.814E+13	1.124E+00
3940	3950	1.117E+13	1.551E+00
3950	3960	2.271E+13	1.091E+00
3960	3970	2.933E+12	2.891E+00
3970	3980	7.089E+12	2.051E+00
3980	3990	6.940E+12	1.971E+00
3990	4000	2.664E+12	3.086E+00
4000	4010	1.963E+12	3.761E+00
4010	4020	3.011E+12	2.535E+00
4020	4030	1.588E+12	3.698E+00
4030	4040	1.171E+12	3.555E+00
4040	4050	1.332E+13	1.390E+00
4050	4060	2.046E+11	9.384E+00
4060	4070	1.300E+12	4.246E+00
4070	4080	6.936E+13	6.695E-01
4080	4090	1.745E+13	1.110E+00
4090	4100	5.665E+12	2.092E+00
4100	4110	1.194E+12	3.943E+00
4110	4120	2.343E+12	2.318E+00
4120	4130	1.419E+12	4.047E+00
4130	4140	9.104E+13	4.628E-01
4140	4150	2.449E+11	9.350E+00
4150	4160	1.285E+13	1.414E+00
4160	4170	1.716E+13	1.161E+00
4170	4180	4.402E+12	2.416E+00
4180	4190	5.037E+13	7.393E-01
4190	4200	8.555E+12	1.307E+00
4200	4210	9.281E+12	1.376E+00
4210	4220	8.070E+11	5.455E+00
4220	4230	1.309E+12	4.087E+00
4230	4240	6.453E+12	2.151E+00
4240	4250	8.603E+12	1.747E+00
4250	4260	1.151E+13	1.397E+00



4260	4270	2.878E+13	9.861E-01
4270	4280	2.692E+12	2.809E+00
4280	4290	3.469E+12	2.624E+00
4290	4300	9.482E+12	1.686E+00
4300	4310	1.366E+11	1.163E+01
4310	4320	4.083E+12	2.324E+00
4320	4330	3.332E+12	2.653E+00
4330	4340	7.407E+11	5.005E+00
4340	4350	2.520E+12	3.115E+00
4350	4360	1.189E+13	1.295E+00
4360	4370	1.074E+14	4.390E-01
4370	4380	8.040E+11	4.797E+00
4380	4390	8.829E+11	4.925E+00
4390	4400	9.248E+11	5.189E+00
4400	4410	1.903E+12	3.514E+00
4410	4420	4.600E+11	6.253E+00
4420	4430	1.273E+12	4.296E+00
4430	4440	4.606E+11	6.643E+00
4440	4450	8.082E+10	1.485E+01
4450	4460	2.521E+13	7.529E-01
4460	4470	9.284E+11	4.668E+00
4470	4480	9.735E+11	3.879E+00
4480	4490	2.231E+12	3.293E+00
4490	4500	1.128E+11	1.318E+01
4500	4510	9.056E+12	1.583E+00
4510	4520	3.394E+12	3.404E+00
4520	4530	4.033E+12	2.382E+00
4530	4540	7.292E+11	5.610E+00
4540	4550	1.341E+12	4.122E+00
4550	4560	1.094E+11	1.379E+01
4560	4570	7.197E+10	1.630E+01
4570	4580	9.469E+12	1.617E+00
4580	4590	1.126E+11	1.285E+01
4590	4600	5.117E+12	1.919E+00
4600	4610	9.200E+11	4.284E+00
4610	4620	1.771E+12	3.429E+00
4620	4630	5.322E+12	2.114E+00
4630	4640	1.940E+13	1.162E+00
4640	4650	3.824E+13	6.998E-01
4650	4660	8.328E+10	1.679E+01
4660	4670	7.182E+12	2.402E+00
4670	4680	3.413E+12	3.236E+00
4680	4690	6.749E+10	1.703E+01

4690	4700	1.012E+11	1.346E+01
4700	4710	5.139E+10	1.897E+01
4710	4720	4.204E+12	2.349E+00
4720	4730	1.217E+12	3.667E+00
4730	4740	2.563E+12	3.125E+00
4740	4750	4.418E+12	2.374E+00
4750	4760	3.328E+12	2.652E+00
4760	4770	6.721E+10	1.809E+01
4770	4780	2.752E+12	3.040E+00
4780	4790	1.924E+13	1.118E+00
4790	4800	9.674E+11	4.133E+00
4800	4810	1.105E+13	1.473E+00
4810	4820	5.244E+10	1.858E+01
4820	4830	1.486E+12	3.927E+00
4830	4840	1.081E+13	1.525E+00
4840	4850	5.713E+10	1.912E+01
4850	4860	6.409E+10	1.631E+01
4860	4870	4.380E+10	2.138E+01
4870	4880	5.886E+12	1.943E+00
4880	4890	7.944E+11	5.487E+00
4890	4900	3.901E+11	7.417E+00
4900	4910	3.954E+10	2.213E+01
4910	4920	2.457E+12	2.837E+00
4920	4930	1.145E+13	1.452E+00
4930	4940	3.489E+10	2.290E+01
4940	4950	5.043E+11	6.373E+00
4950	4960	2.693E+11	9.006E+00
4960	4970	2.136E+13	1.066E+00
4970	4980	3.455E+12	2.314E+00
4980	4990	4.194E+10	2.037E+01
4990	5000	1.030E+12	4.133E+00
5000	6000	2.579E+12	7.258E-01
6000	7000	3.270E+11	1.380E+00
7000	8000	9.550E+08	1.516E+01
8000	9000	1.388E+07	6.808E+01
9000	10000	9.600E+03	9.900E+01
10000	11000	3.479E+06	9.900E+01
11000	12000	0.000E+00	0.000E+00
12000	13000	0.000E+00	0.000E+00
13000	14000	0.000E+00	0.000E+00
14000	15000	0.000E+00	0.000E+00

Appendix C

Th-232 target + Inconel625 housing

E1 (keV)	E2 (keV)	Ph/s	err (%)
0	10	0.000E+00	0.000E+00
10	20	3.865E+09	3.729E-01
20	30	1.368E+09	5.098E-01
30	40	2.700E+09	3.611E-01
40	50	5.203E+09	2.543E-01
50	60	8.870E+09	1.905E-01
60	70	2.188E+10	1.397E-01
70	80	3.333E+10	1.133E-01
80	90	4.543E+10	9.713E-02
90	100	2.527E+11	5.473E-02
100	110	1.115E+11	6.605E-02
110	120	2.851E+10	1.387E-01
120	130	5.676E+10	9.213E-02
130	140	3.972E+10	9.982E-02
140	150	6.941E+10	8.762E-02
150	160	9.054E+10	9.057E-02
160	170	5.211E+10	9.623E-02
170	180	4.255E+10	9.651E-02
180	190	4.646E+10	8.948E-02
190	200	5.998E+10	9.657E-02
200	210	6.421E+10	8.230E-02
210	220	5.833E+10	9.352E-02
220	230	5.483E+10	8.641E-02
230	240	6.505E+10	8.384E-02
240	250	7.812E+10	1.010E-01
250	260	5.920E+10	1.025E-01
260	270	6.454E+10	8.232E-02
270	280	8.863E+10	8.486E-02
280	290	4.197E+10	9.705E-02
290	300	5.772E+10	8.895E-02
300	310	1.166E+11	9.452E-02
310	320	6.357E+10	9.250E-02
320	330	7.563E+10	9.101E-02
330	340	7.309E+10	9.847E-02
340	350	6.061E+10	9.112E-02
350	360	7.361E+10	1.143E-01
360	370	4.158E+10	9.718E-02
370	380	1.052E+11	8.773E-02
380	390	8.063E+10	9.958E-02

390	400	5.672E+10	1.082E-01
400	410	5.634E+10	1.199E-01
410	420	4.803E+10	1.046E-01
420	430	3.875E+10	1.015E-01
430	440	6.001E+10	1.030E-01
440	450	4.970E+10	8.574E-02
450	460	3.955E+10	1.080E-01
460	470	5.528E+10	9.783E-02
470	480	6.141E+10	1.009E-01
480	490	8.242E+10	1.004E-01
490	500	4.371E+10	9.203E-02
500	510	5.936E+10	1.077E-01
510	520	1.944E+12	3.654E-02
520	530	4.328E+10	1.308E-01
530	540	4.753E+10	1.407E-01
540	550	3.982E+10	1.270E-01
550	560	7.411E+10	1.132E-01
560	570	3.422E+10	1.453E-01
570	580	1.732E+10	1.440E-01
580	590	5.820E+10	1.075E-01
590	600	4.047E+10	1.626E-01
600	610	2.745E+10	1.317E-01
610	620	5.794E+10	1.242E-01
620	630	3.753E+10	1.276E-01
630	640	1.947E+10	1.477E-01
640	650	3.275E+10	1.409E-01
650	660	6.545E+10	1.289E-01
660	670	4.341E+10	1.541E-01
670	680	3.176E+10	1.481E-01
680	690	4.399E+10	1.195E-01
690	700	2.895E+10	1.483E-01
700	710	8.116E+10	9.434E-02
710	720	1.869E+10	1.691E-01
720	730	4.790E+10	1.391E-01
730	740	3.068E+10	1.459E-01
740	750	1.578E+11	9.341E-02
750	760	1.653E+10	2.383E-01
760	770	4.132E+10	1.409E-01
770	780	4.781E+10	1.423E-01
780	790	3.440E+10	1.480E-01
790	800	2.655E+10	1.895E-01
800	810	1.682E+10	1.607E-01
810	820	5.778E+10	1.074E-01

820	830	1.514E+10	1.529E-01
830	840	4.067E+10	1.587E-01
840	850	6.681E+10	1.027E-01
850	860	9.474E+09	2.028E-01
860	870	2.425E+10	1.579E-01
870	880	2.080E+10	2.239E-01
880	890	3.299E+10	1.506E-01
890	900	2.140E+10	1.636E-01
900	910	1.326E+11	1.402E-01
910	920	3.148E+10	1.703E-01
920	930	3.105E+10	1.605E-01
930	940	1.872E+11	6.860E-02
940	950	2.279E+10	1.354E-01
950	960	1.274E+10	1.925E-01
960	970	1.480E+10	1.876E-01
970	980	1.300E+10	2.029E-01
980	990	8.029E+10	8.849E-02
990	1000	7.699E+09	2.383E-01
1000	1010	1.470E+10	2.022E-01
1010	1020	5.942E+10	1.114E-01
1020	1030	3.122E+10	1.402E-01
1030	1040	2.982E+10	1.751E-01
1040	1050	1.520E+10	1.523E-01
1050	1060	2.782E+10	2.090E-01
1060	1070	1.119E+10	1.783E-01
1070	1080	4.453E+10	1.790E-01
1080	1090	1.658E+10	2.731E-01
1090	1100	2.247E+10	1.976E-01
1100	1110	1.111E+10	1.965E-01
1110	1120	1.040E+10	2.507E-01
1120	1130	7.466E+10	1.260E-01
1130	1140	1.259E+10	2.452E-01
1140	1150	1.486E+10	2.385E-01
1150	1160	8.982E+10	1.333E-01
1160	1170	8.464E+09	2.274E-01
1170	1180	1.873E+10	2.390E-01
1180	1190	1.002E+10	3.202E-01
1190	1200	5.908E+09	2.610E-01
1200	1210	1.253E+10	1.997E-01
1210	1220	9.270E+09	2.245E-01
1220	1230	2.038E+10	2.016E-01
1230	1240	2.859E+10	8.613E-02
1240	1250	1.881E+10	1.918E-01

1250	1260	7.155E+09	2.648E-01
1260	1270	6.489E+09	2.725E-01
1270	1280	7.954E+09	2.636E-01
1280	1290	8.567E+09	2.351E-01
1290	1300	1.023E+10	2.613E-01
1300	1310	1.159E+10	1.997E-01
1310	1320	8.794E+10	8.129E-02
1320	1330	5.116E+10	1.261E-01
1330	1340	1.626E+10	2.206E-01
1340	1350	4.685E+09	2.814E-01
1350	1360	4.311E+09	3.051E-01
1360	1370	1.725E+10	1.756E-01
1370	1380	2.378E+11	8.264E-02
1380	1390	2.881E+10	2.206E-01
1390	1400	6.323E+09	2.544E-01
1400	1410	3.449E+10	1.417E-01
1410	1420	1.167E+10	2.209E-01
1420	1430	1.312E+10	3.594E-01
1430	1440	2.288E+11	8.153E-02
1440	1450	7.796E+09	2.827E-01
1450	1460	4.691E+09	2.975E-01
1460	1470	7.324E+09	2.988E-01
1470	1480	2.243E+10	1.991E-01
1480	1490	4.313E+09	4.503E-01
1490	1500	2.545E+09	3.578E-01
1500	1510	1.145E+10	2.496E-01
1510	1520	5.329E+09	2.758E-01
1520	1530	1.109E+10	2.436E-01
1530	1540	8.573E+09	2.751E-01
1540	1550	2.762E+09	3.731E-01
1550	1560	1.928E+09	4.406E-01
1560	1570	1.517E+10	2.320E-01
1570	1580	7.041E+09	2.487E-01
1580	1590	3.259E+09	3.483E-01
1590	1600	1.274E+10	2.589E-01
1600	1610	2.982E+09	3.580E-01
1610	1620	9.470E+09	2.299E-01
1620	1630	2.156E+09	4.275E-01
1630	1640	4.252E+09	3.456E-01
1640	1650	3.293E+09	3.665E-01
1650	1660	2.709E+09	3.451E-01
1660	1670	2.694E+09	3.526E-01
1670	1680	5.696E+09	2.785E-01

1680	1690	2.141E+09	4.309E-01
1690	1700	3.531E+09	3.520E-01
1700	1710	2.390E+09	3.670E-01
1710	1720	4.279E+09	2.903E-01
1720	1730	2.722E+09	3.491E-01
1730	1740	4.127E+09	3.122E-01
1740	1750	2.635E+09	3.570E-01
1750	1760	2.325E+10	1.527E-01
1760	1770	3.403E+09	3.258E-01
1770	1780	6.934E+09	2.378E-01
1780	1790	1.285E+09	5.839E-01
1790	1800	5.640E+09	4.243E-01
1800	1810	3.380E+09	3.661E-01
1810	1820	3.887E+09	4.155E-01
1820	1830	1.229E+09	5.301E-01
1830	1840	8.357E+09	2.729E-01
1840	1850	3.201E+09	3.608E-01
1850	1860	9.811E+09	2.407E-01
1860	1870	1.674E+09	5.334E-01
1870	1880	2.024E+09	4.731E-01
1880	1890	3.441E+09	3.430E-01
1890	1900	5.527E+09	2.652E-01
1900	1910	2.030E+09	4.537E-01
1910	1920	3.892E+10	1.268E-01
1920	1930	1.326E+10	2.071E-01
1930	1940	1.348E+09	5.481E-01
1940	1950	2.201E+09	3.860E-01
1950	1960	1.243E+09	5.179E-01
1960	1970	4.562E+09	3.156E-01
1970	1980	2.566E+09	4.232E-01
1980	1990	1.166E+09	4.658E-01
1990	2000	6.770E+09	2.442E-01
2000	2010	3.250E+09	3.597E-01
2010	2020	4.419E+09	2.737E-01
2020	2030	4.075E+09	3.293E-01
2030	2040	1.283E+10	1.890E-01
2040	2050	1.850E+09	5.437E-01
2050	2060	3.956E+09	3.380E-01
2060	2070	9.841E+08	6.091E-01
2070	2080	1.485E+09	5.657E-01
2080	2090	1.404E+09	5.179E-01
2090	2100	2.525E+09	3.527E-01
2100	2110	6.125E+09	2.294E-01

2110	2120	2.645E+09	4.082E-01
2120	2130	3.301E+09	3.295E-01
2130	2140	1.172E+09	5.521E-01
2140	2150	9.844E+08	6.871E-01
2150	2160	2.422E+09	4.108E-01
2160	2170	2.450E+09	5.513E-01
2170	2180	2.583E+09	4.269E-01
2180	2190	1.358E+10	1.989E-01
2190	2200	5.951E+09	3.010E-01
2200	2210	1.885E+09	5.471E-01
2210	2220	2.390E+09	4.139E-01
2220	2230	1.595E+09	4.518E-01
2230	2240	5.448E+09	3.221E-01
2240	2250	3.827E+09	2.426E-01
2250	2260	8.633E+08	7.066E-01
2260	2270	6.755E+08	8.115E-01
2270	2280	9.285E+08	5.917E-01
2280	2290	1.352E+09	4.671E-01
2290	2300	1.401E+09	4.648E-01
2300	2310	4.963E+08	8.057E-01
2310	2320	5.597E+10	1.593E-01
2320	2330	1.884E+09	3.895E-01
2330	2340	7.928E+09	2.139E-01
2340	2350	2.158E+09	4.691E-01
2350	2360	2.687E+09	4.243E-01
2360	2370	7.430E+08	7.052E-01
2370	2380	7.950E+08	7.645E-01
2380	2390	4.760E+08	8.482E-01
2390	2400	7.880E+09	3.185E-01
2400	2410	5.407E+08	8.231E-01
2410	2420	7.329E+08	5.891E-01
2420	2430	8.515E+08	5.604E-01
2430	2440	1.394E+09	5.238E-01
2440	2450	2.538E+09	6.245E-01
2450	2460	8.131E+08	6.671E-01
2460	2470	8.952E+08	7.404E-01
2470	2480	2.575E+09	4.277E-01
2480	2490	1.435E+09	5.591E-01
2490	2500	6.027E+08	8.554E-01
2500	2510	1.852E+09	4.789E-01
2510	2520	6.876E+08	7.152E-01
2520	2530	8.788E+08	6.438E-01
2530	2540	4.428E+08	9.093E-01



2540	2550	2.236E+09	4.556E-01
2550	2560	3.145E+09	4.837E-01
2560	2570	3.161E+09	3.831E-01
2570	2580	3.532E+09	3.945E-01
2580	2590	3.955E+08	8.151E-01
2590	2600	5.396E+09	1.086E-01
2600	2610	1.181E+09	5.921E-01
2610	2620	4.818E+09	3.214E-01
2620	2630	4.357E+08	9.635E-01
2630	2640	1.902E+09	5.229E-01
2640	2650	1.272E+09	5.078E-01
2650	2660	1.365E+09	6.692E-01
2660	2670	1.399E+09	5.932E-01
2670	2680	8.066E+08	7.433E-01
2680	2690	1.124E+09	6.314E-01
2690	2700	4.664E+08	8.060E-01
2700	2710	3.799E+09	3.615E-01
2710	2720	6.228E+08	8.593E-01
2720	2730	5.775E+08	7.492E-01
2730	2740	4.733E+08	7.930E-01
2740	2750	8.807E+08	5.640E-01
2750	2760	5.231E+09	3.997E-01
2760	2770	9.918E+07	1.931E+00
2770	2780	1.494E+09	5.025E-01
2780	2790	3.381E+09	3.969E-01
2790	2800	4.233E+08	9.785E-01
2800	2810	4.915E+08	8.976E-01
2810	2820	2.639E+08	1.235E+00
2820	2830	1.561E+09	5.100E-01
2830	2840	9.081E+08	6.243E-01
2840	2850	3.972E+08	1.042E+00
2850	2860	9.074E+08	6.496E-01
2860	2870	7.490E+08	7.305E-01
2870	2880	3.712E+08	1.232E+00
2880	2890	4.889E+08	7.502E-01
2890	2900	5.291E+08	7.925E-01
2900	2910	2.088E+08	1.198E+00
2910	2920	1.387E+09	5.717E-01
2920	2930	6.842E+08	8.248E-01
2930	2940	3.391E+08	1.264E+00
2940	2950	1.186E+09	6.149E-01
2950	2960	3.681E+08	1.027E+00
2960	2970	4.481E+08	7.840E-01

2970	2980	5.738E+08	8.186E-01
2980	2990	3.783E+08	9.360E-01
2990	3000	3.809E+08	1.080E+00
3000	3010	7.647E+08	5.815E-01
3010	3020	1.559E+08	1.601E+00
3020	3030	3.406E+08	1.167E+00
3030	3040	2.400E+08	1.201E+00
3040	3050	1.288E+09	5.328E-01
3050	3060	4.343E+08	9.734E-01
3060	3070	2.093E+08	1.415E+00
3070	3080	9.103E+07	2.121E+00
3080	3090	1.661E+08	1.545E+00
3090	3100	8.798E+08	5.768E-01
3100	3110	2.247E+08	1.773E+00
3110	3120	2.193E+08	1.410E+00
3120	3130	5.537E+08	9.349E-01
3130	3140	1.071E+08	1.934E+00
3140	3150	1.309E+09	7.218E-01
3150	3160	4.966E+07	2.650E+00
3160	3170	1.408E+08	1.708E+00
3170	3180	1.962E+08	1.540E+00
3180	3190	1.298E+09	6.664E-01
3190	3200	2.809E+08	1.272E+00
3200	3210	1.131E+09	2.227E-01
3210	3220	8.182E+08	7.659E-01
3220	3230	9.242E+08	5.970E-01
3230	3240	4.886E+08	8.962E-01
3240	3250	2.921E+08	1.164E+00
3250	3260	3.173E+09	1.997E-01
3260	3270	2.593E+08	1.300E+00
3270	3280	7.640E+08	3.757E-01
3280	3290	1.140E+09	5.513E-01
3290	3300	1.712E+08	1.351E+00
3300	3310	3.715E+08	1.039E+00
3310	3320	1.240E+09	5.088E-01
3320	3330	4.624E+07	2.924E+00
3330	3340	1.610E+08	1.470E+00
3340	3350	1.101E+08	1.948E+00
3350	3360	1.536E+08	1.431E+00
3360	3370	1.047E+09	6.227E-01
3370	3380	4.398E+08	1.186E+00
3380	3390	1.014E+09	6.361E-01
3390	3400	6.308E+08	9.085E-01

3400	3410	8.142E+08	6.045E-01
3410	3420	3.380E+07	3.504E+00
3420	3430	1.556E+07	4.985E+00
3430	3440	1.037E+08	2.052E+00
3440	3450	2.366E+08	1.351E+00
3450	3460	7.174E+08	6.345E-01
3460	3470	2.012E+08	1.438E+00
3470	3480	1.064E+08	1.856E+00
3480	3490	6.540E+07	2.680E+00
3490	3500	4.937E+07	3.084E+00
3500	3510	5.184E+08	8.764E-01
3510	3520	9.892E+07	2.060E+00
3520	3530	3.112E+07	3.667E+00
3530	3540	7.703E+08	7.107E-01
3540	3550	2.908E+08	8.474E-01
3550	3560	3.763E+08	1.093E+00
3560	3570	7.718E+07	1.748E+00
3570	3580	1.423E+09	6.120E-01
3580	3590	6.172E+07	2.710E+00
3590	3600	1.540E+09	6.004E-01
3600	3610	1.093E+08	1.892E+00
3610	3620	2.148E+08	1.332E+00
3620	3630	1.871E+08	1.388E+00
3630	3640	3.094E+08	1.207E+00
3640	3650	1.239E+08	1.865E+00
3650	3660	2.675E+08	1.226E+00
3660	3670	2.478E+08	1.299E+00
3670	3680	7.025E+07	2.323E+00
3680	3690	2.046E+08	1.413E+00
3690	3700	1.247E+07	5.366E+00
3700	3710	3.013E+07	3.437E+00
3710	3720	1.438E+08	1.553E+00
3720	3730	3.372E+07	3.436E+00
3730	3740	1.120E+08	1.987E+00
3740	3750	1.602E+08	1.502E+00
3750	3760	1.328E+07	5.338E+00
3760	3770	3.488E+07	2.895E+00
3770	3780	2.007E+08	1.420E+00
3780	3790	3.455E+07	3.461E+00
3790	3800	9.504E+07	2.184E+00
3800	3810	2.380E+08	1.523E+00
3810	3820	1.461E+08	1.489E+00
3820	3830	1.269E+08	1.840E+00

3830	3840	1.512E+08	1.625E+00
3840	3850	1.678E+08	1.575E+00
3850	3860	3.359E+07	3.605E+00
3860	3870	2.353E+08	1.369E+00
3870	3880	5.357E+07	2.713E+00
3880	3890	7.829E+07	2.251E+00
3890	3900	3.594E+07	3.638E+00
3900	3910	4.071E+07	3.252E+00
3910	3920	3.007E+08	1.161E+00
3920	3930	1.224E+09	5.794E-01
3930	3940	1.775E+08	1.459E+00
3940	3950	1.058E+08	1.989E+00
3950	3960	2.159E+08	1.499E+00
3960	3970	2.905E+07	4.026E+00
3970	3980	7.039E+07	2.684E+00
3980	3990	6.823E+07	2.565E+00
3990	4000	2.785E+07	4.065E+00
4000	4010	2.754E+07	4.145E+00
4010	4020	2.912E+07	3.364E+00
4020	4030	7.714E+07	2.251E+00
4030	4040	1.197E+07	5.021E+00
4040	4050	1.290E+08	1.900E+00
4050	4060	3.923E+06	8.990E+00
4060	4070	1.710E+07	4.461E+00
4070	4080	6.665E+08	8.793E-01
4080	4090	1.644E+08	1.539E+00
4090	4100	5.739E+07	2.666E+00
4100	4110	1.338E+07	5.033E+00
4110	4120	2.807E+07	2.801E+00
4120	4130	1.514E+07	5.485E+00
4130	4140	8.610E+08	6.807E-01
4140	4150	4.288E+06	8.825E+00
4150	4160	1.229E+08	1.895E+00
4160	4170	1.626E+08	1.626E+00
4170	4180	4.344E+07	3.372E+00
4180	4190	4.772E+08	1.043E+00
4190	4200	8.427E+07	1.805E+00
4200	4210	9.324E+07	1.794E+00
4210	4220	9.129E+06	6.539E+00
4220	4230	1.441E+07	4.788E+00
4230	4240	6.409E+07	2.713E+00
4240	4250	8.409E+07	2.281E+00
4250	4260	1.094E+08	1.826E+00

4260	4270	2.744E+08	1.255E+00
4270	4280	2.714E+07	3.529E+00
4280	4290	3.366E+07	3.421E+00
4290	4300	9.448E+07	1.991E+00
4300	4310	2.551E+06	1.149E+01
4310	4320	4.003E+07	3.252E+00
4320	4330	3.298E+07	3.270E+00
4330	4340	8.164E+06	5.869E+00
4340	4350	2.637E+07	3.962E+00
4350	4360	1.144E+08	1.782E+00
4360	4370	1.014E+09	6.617E-01
4370	4380	1.210E+07	4.892E+00
4380	4390	8.613E+06	6.723E+00
4390	4400	1.001E+07	6.136E+00
4400	4410	1.880E+07	4.684E+00
4410	4420	5.429E+06	7.573E+00
4420	4430	1.415E+07	5.322E+00
4430	4440	6.618E+06	6.991E+00
4440	4450	2.211E+06	1.168E+01
4450	4460	2.365E+08	9.882E-01
4460	4470	9.992E+06	6.176E+00
4470	4480	1.112E+07	4.934E+00
4480	4490	2.283E+07	4.597E+00
4490	4500	2.758E+06	9.927E+00
4500	4510	8.619E+07	2.042E+00
4510	4520	3.394E+07	4.473E+00
4520	4530	4.119E+07	3.124E+00
4530	4540	8.526E+06	6.807E+00
4540	4550	1.444E+07	5.261E+00
4550	4560	1.352E+06	1.522E+01
4560	4570	1.513E+06	1.476E+01
4570	4580	9.567E+07	2.193E+00
4580	4590	1.916E+06	1.362E+01
4590	4600	5.089E+07	2.407E+00
4600	4610	9.892E+06	4.962E+00
4610	4620	1.778E+07	4.879E+00
4620	4630	5.373E+07	2.696E+00
4630	4640	1.863E+08	1.562E+00
4640	4650	3.675E+08	9.874E-01
4650	4660	1.513E+06	1.621E+01
4660	4670	7.362E+07	3.228E+00
4670	4680	3.292E+07	4.244E+00
4680	4690	1.176E+06	1.627E+01

4690	4700	2.003E+06	1.388E+01
4700	4710	1.150E+06	1.733E+01
4710	4720	4.304E+07	3.205E+00
4720	4730	1.355E+07	4.880E+00
4730	4740	2.782E+07	4.045E+00
4740	4750	4.606E+07	3.263E+00
4750	4760	3.431E+07	3.526E+00
4760	4770	1.743E+06	1.400E+01
4770	4780	2.821E+07	3.947E+00
4780	4790	1.861E+08	1.575E+00
4790	4800	9.715E+06	5.930E+00
4800	4810	1.118E+08	1.858E+00
4810	4820	1.265E+06	1.715E+01
4820	4830	1.569E+07	5.199E+00
4830	4840	1.093E+08	1.926E+00
4840	4850	1.185E+06	1.694E+01
4850	4860	1.130E+06	1.696E+01
4860	4870	1.090E+06	1.756E+01
4870	4880	5.780E+07	2.553E+00
4880	4890	9.848E+06	6.757E+00
4890	4900	3.705E+06	1.078E+01
4900	4910	8.912E+05	2.038E+01
4910	4920	2.373E+07	4.052E+00
4920	4930	1.127E+08	1.890E+00
4930	4940	9.648E+05	1.683E+01
4940	4950	4.847E+06	8.907E+00
4950	4960	2.767E+06	1.085E+01
4960	4970	2.065E+08	1.446E+00
4970	4980	3.619E+07	3.090E+00
4980	4990	9.370E+05	1.978E+01
4990	5000	1.112E+07	4.673E+00
5000	6000	2.592E+09	9.459E-01
6000	7000	5.790E+08	1.383E+00
7000	8000	2.383E+07	4.659E+00
8000	9000	3.477E+05	2.416E+01
9000	10000	1.887E+05	3.095E+01
10000	11000	7.315E+04	4.963E+01
11000	12000	1.829E+04	9.900E+01
12000	13000	1.935E-23	9.900E+01
13000	14000	0.000E+00	0.000E+00
14000	15000	0.000E+00	0.000E+00

Appendix D

Thorium Target					
A	Sym.	Z	Bq	Err. (%)	T 1/2 (s)
3	H	1	8.866E+07	0.2	3.888E+08
6	He	2	1.642E+08	2.5	8.067E-01
7	Be	4	5.157E+06	6.3	4.604E+06
8	Li	3	1.307E+07	8.8	8.380E-01
8	Be	4	1.403E+07	8.5	6.709E-17
8	B	5	9.144E+05	31	7.700E-01
9	Li	3	9.221E+04	21.5	1.783E-01
10	C	6	1.519E+06	37.4	1.925E+01
11	Be	4	6.846E+06	17.1	1.381E+01
11	C	6	9.892E+06	14.8	1.223E+03
14	O	8	2.227E+05	99	7.061E+01
15	C	6	1.644E+07	10.1	2.449E+00
15	O	8	6.710E+05	57.4	1.222E+02
16	C	6	1.067E+06	28.2	7.470E-01
16	N	7	1.771E+07	10.4	7.130E+00
17	N	7	1.391E+07	13	4.173E+00
17	F	9	2.225E+05	99	6.449E+01
18	N	7	7.407E+05	31.1	6.240E-01
18	F	9	2.024E+06	32.9	6.586E+03
18	Ne	10	1.486E+05	99	1.672E+00
19	O	8	2.105E+07	9.5	2.691E+01
19	Ne	10	2.161E+05	99	1.734E+01
20	O	8	1.710E+07	10.8	1.351E+01
20	F	9	2.642E+07	8.8	1.100E+01
21	O	8	3.857E+06	20.9	3.420E+00
21	F	9	1.570E+07	10.5	4.158E+00
22	O	8	3.306E+05	70.6	2.250E+00
22	F	9	1.228E+07	12.6	4.230E+00
23	Ne	10	2.340E+07	9.2	3.724E+01
23	Mg	12	4.232E+05	70.9	1.132E+01
24	Ne	10	5.089E+07	6.4	2.028E+02
24	Na	11	6.410E+07	5.5	5.385E+04
28	Al	13	1.567E+06	37.3	1.345E+02
29	Al	13	2.245E+05	99	3.936E+02
30	P	15	1.343E+06	40.5	1.499E+02
31	Si	14	4.553E+05	69.9	9.438E+03
32	P	15	1.522E+06	20.9	1.232E+06
33	Si	14	2.011E+05	99	6.180E+00

33	P	15	3.537E+05	35	2.189E+06
34	P	15	2.127E+05	99	1.243E+01
34	Cl	17	8.510E+05	30.4	1.526E+00
35	Si	14	9.250E+04	99	7.800E-01
35	P	15	8.888E+05	49.7	4.730E+01
35	S	16	2.072E+05	25.4	7.561E+06
37	P	15	1.666E+05	99	2.310E+00
37	S	16	2.249E+05	99	3.030E+02
37	Ar	18	1.185E+06	17.3	3.027E+06
38	Cl	17	4.498E+05	49.7	2.234E+03
38	K	19	4.492E+05	49.6	4.582E+02
39	Cl	17	2.249E+05	99	3.336E+03
39	Ca	20	1.004E+05	99	8.596E-01
40	S	16	2.079E+05	99	8.800E+00
40	Cl	17	2.249E+05	99	8.100E+01
41	Cl	17	4.418E+05	70	3.840E+01
41	Ar	18	8.997E+05	49.6	6.560E+03
42	Cl	17	8.126E+05	49.8	6.800E+00
42	K	19	1.575E+06	37.5	4.450E+04
42	Sc	21	1.627E+05	49.7	6.813E-01
43	Sc	21	5.398E+06	19.4	1.401E+04
44	Ar	18	4.494E+05	70	7.122E+02
44	K	19	1.349E+06	40.5	1.328E+03
44	Sc	21	1.226E+07	9	1.414E+04
45	Ar	18	2.178E+05	99	2.148E+01
45	K	19	1.349E+06	40.6	1.038E+03
45	Ca	20	5.981E+04	35.2	1.415E+07
45	Ti	22	8.097E+06	16.4	1.109E+04
46	K	19	4.469E+05	70.4	1.050E+02
46	Sc	21	2.737E+05	15.6	7.239E+06
46	V	23	1.309E+05	40.7	4.224E-01
47	K	19	1.081E+06	44.3	1.750E+01
47	Ca	20	1.746E+06	29.8	3.919E+05
47	Sc	21	2.116E+06	25.4	2.890E+05
47	V	23	4.272E+06	22.1	1.956E+03
48	Sc	21	1.714E+06	34.9	1.572E+05
48	V	23	3.402E+06	14.2	1.380E+06
48	Cr	24	6.734E+05	57.6	7.762E+04
49	Ca	20	8.986E+05	49.7	5.229E+02
49	Sc	21	2.249E+06	31.5	3.432E+03
49	V	23	1.863E+05	14.1	2.920E+07
49	Cr	24	3.823E+06	24.9	2.538E+03
50	Ca	20	4.280E+05	70.9	1.390E+01



50	Sc	21	1.776E+06	27.9	1.025E+02
50	Mn	25	1.944E+04	71	2.831E-01
51	Sc	21	1.702E+06	35	1.240E+01
51	Ti	22	2.922E+06	27.5	3.456E+02
51	Cr	24	6.113E+05	25.4	2.393E+06
51	Mn	25	8.995E+05	49.7	2.772E+03
52	Ca	20	1.935E+05	99	4.600E+00
52	Sc	21	1.050E+06	44.3	8.200E+00
52	Ti	22	6.040E+06	20	1.020E+02
52	V	23	7.643E+06	17.6	2.250E+02
52	Mn	25	4.320E+05	39.7	4.831E+05
53	Sc	21	2.249E+05	70.1	1.000E+00
53	Ti	22	3.090E+06	26.1	3.270E+01
53	V	23	7.616E+06	16.6	9.660E+01
54	Ti	22	2.551E+06	22.9	1.500E+00
54	V	23	8.474E+06	15.7	4.980E+01
54	Mn	25	1.188E+04	57.4	2.697E+07
55	V	23	5.867E+06	19.2	6.540E+00
55	Cr	24	1.101E+07	14.6	2.098E+02
56	Cr	24	1.325E+07	13.4	3.564E+02
56	Mn	25	1.710E+07	11.7	9.283E+03
57	Cr	24	9.795E+06	14.5	2.110E+01
57	Mn	25	1.637E+07	11.2	8.540E+01
58	Cr	24	1.365E+07	12.3	7.000E+00
58	Mn	25	1.974E+07	9.8	3.000E+00
59	Cr	24	2.645E+06	17.6	7.400E-01
59	Mn	25	2.421E+07	9	4.600E+00
59	Fe	26	4.638E+06	7.6	3.845E+06
60	Cr	24	2.200E+06	17.4	5.700E-01
60	Mn	25	5.215E+06	12.6	2.800E-01
60	Co	27	1.745E+04	12.9	1.662E+08
60	Cu	29	2.248E+05	99	1.422E+03
61	Mn	25	9.999E+06	9.4	7.100E-01
61	Fe	26	5.369E+07	6.5	3.588E+02
61	Co	27	7.130E+07	5.7	5.940E+03
62	Mn	25	7.982E+06	11.4	8.800E-01
62	Fe	26	6.803E+07	5.8	6.800E+01
62	Co	27	8.473E+07	4.9	9.000E+01
63	Mn	25	9.419E+05	11.7	2.500E-01
63	Fe	26	4.932E+07	6.3	6.100E+00
63	Co	27	1.121E+08	4.5	2.740E+01
63	Ni	28	2.007E+04	4.2	3.157E+09
64	Fe	26	4.390E+07	5.8	2.000E+00

64	Co	27	5.904E+07	5	3.000E-01
64	Cu	29	7.198E+06	18.2	4.572E+04
65	Fe	26	7.078E+06	7.1	4.000E-01
65	Co	27	1.063E+08	3.6	1.200E+00
65	Ni	28	2.699E+08	2.8	9.062E+03
65	Zn	30	3.029E+04	40.3	2.110E+07
66	Co	27	7.656E+06	3.6	2.300E-01
66	Ni	28	3.352E+08	2.6	1.966E+05
66	Cu	29	3.948E+08	2.4	3.053E+02
66	Ga	31	2.249E+05	99	3.416E+04
67	Co	27	3.347E+07	3.7	4.200E-01
67	Ni	28	3.971E+08	2.3	2.100E+01
67	Cu	29	5.308E+08	1.9	2.226E+05
67	Ga	31	9.193E+05	44.4	2.818E+05
68	Fe	26	1.648E+04	11	1.000E-01
68	Co	27	3.025E+06	4.3	1.800E-01
68	Ni	28	4.812E+08	2.2	1.900E+01
68	Cu	29	7.493E+08	1.6	3.110E+01
68	Ga	31	5.852E+06	19.4	4.058E+03
69	Co	27	8.201E+06	4.7	2.700E-01
69	Ni	28	3.737E+08	2.4	1.140E+01
69	Cu	29	9.683E+08	1.5	1.710E+02
69	Zn	30	1.151E+09	1.3	3.384E+03
69	Ge	32	6.525E+05	57.7	1.406E+05
70	Cu	29	6.503E+08	1.5	4.450E+01
70	Ga	31	9.712E+07	4.8	1.268E+03
70	As	33	2.249E+05	99	3.156E+03
71	Ni	28	1.686E+08	3.1	1.860E+00
71	Cu	29	1.108E+09	1.5	1.950E+01
71	Zn	30	1.451E+09	1.2	1.470E+02
71	Ge	32	8.701E+06	6.6	9.876E+05
71	As	33	1.174E+06	47.1	2.350E+05
72	Ni	28	1.681E+08	3.2	2.060E+00
72	Cu	29	8.199E+08	1.6	6.600E+00
72	Zn	30	2.204E+09	1	1.674E+05
72	Ga	31	2.622E+09	0.9	5.076E+04
72	As	33	4.340E+06	21.7	9.360E+04
72	Se	34	1.087E+05	99	7.258E+05
73	Ni	28	3.822E+07	5.2	9.000E-01
73	Cu	29	7.310E+08	1.5	3.900E+00
73	Zn	30	1.684E+09	0.9	2.350E+01
73	Ga	31	3.312E+09	0.7	1.750E+04
73	As	33	1.561E+06	10	6.938E+06

74	Ni	28	3.174E+07	6	1.100E+00
74	Cu	29	3.262E+08	2.1	1.594E+00
74	Zn	30	2.473E+09	0.9	9.600E+01
74	Ga	31	2.959E+09	0.6	4.872E+02
74	As	33	1.779E+07	6	1.535E+06
75	Cu	29	2.327E+08	2.5	1.300E+00
75	Zn	30	1.429E+09	1.2	1.020E+01
75	Ga	31	4.344E+09	0.7	1.260E+02
75	Ge	32	5.533E+09	0.6	4.967E+03
75	Se	34	5.798E+05	12.5	1.035E+07
75	Br	35	4.498E+05	70.5	5.802E+03
76	Cu	29	5.299E+07	3.9	6.100E-01
76	Zn	30	1.411E+09	1.2	5.700E+00
76	Ga	31	3.858E+09	0.7	2.910E+01
76	As	33	6.120E+08	1.9	9.475E+04
76	Br	35	8.972E+05	39.3	5.832E+04
76	Kr	36	2.249E+05	99	5.328E+04
77	Cu	29	2.431E+07	4.5	4.690E-01
77	Zn	30	4.689E+08	1.4	2.080E+00
77	Ga	31	3.780E+09	0.7	1.320E+01
77	Ge	32	2.577E+09	0.6	4.068E+04
77	As	33	8.421E+09	0.4	1.398E+05
77	Br	35	1.137E+07	9	2.053E+05
77	Kr	36	4.498E+05	70.3	4.464E+03
78	Cu	29	3.646E+06	8.9	3.420E-01
78	Zn	30	3.664E+08	2.1	1.470E+00
78	Ga	31	2.491E+09	0.9	5.090E+00
78	Ge	32	8.120E+09	0.5	5.280E+03
78	As	33	1.069E+10	0.5	5.442E+03
78	Br	35	3.638E+07	7.3	3.876E+02
78	Rb	37	2.473E+05	64.5	1.060E+03
79	Cu	29	3.493E+05	12.8	1.880E-01
79	Zn	30	9.849E+07	3.3	9.950E-01
79	Ga	31	1.740E+09	1	2.847E+00
79	Ge	32	3.973E+09	0.6	1.898E+01
79	As	33	1.124E+10	0.4	5.406E+02
79	Kr	36	6.597E+06	13.6	1.261E+05
79	Rb	37	8.994E+05	49.9	1.374E+03
79	Sr	38	2.238E+05	99	1.350E+02
80	Zn	30	3.257E+07	4.4	5.450E-01
80	Ga	31	6.775E+08	1.5	1.697E+00
80	Ge	32	5.974E+09	0.6	2.950E+01
80	As	33	1.099E+10	0.4	1.520E+01

80	Br	35	5.116E+08	1.5	1.061E+03
80	Rb	37	2.204E+05	99	3.400E+01
81	Zn	30	1.596E+06	11.6	2.900E-01
81	Ga	31	4.194E+08	1.7	1.221E+00
81	Ge	32	1.510E+09	0.8	7.600E+00
81	As	33	1.091E+10	0.4	3.330E+01
81	Se	34	1.564E+10	0.3	1.107E+03
81	Rb	37	5.559E+06	13.8	1.647E+04
81	Sr	38	2.248E+05	99	1.338E+03
82	Ga	31	5.540E+07	3.5	6.020E-01
82	Ge	32	2.417E+09	0.9	4.600E+00
82	As	33	5.371E+09	0.5	1.910E+01
82	Br	35	2.773E+09	0.6	1.271E+05
82	Rb	37	8.427E+06	11.5	7.638E+01
82	Sr	38	2.633E+05	40.4	2.208E+06
83	Ga	31	9.752E+06	5.3	3.100E-01
83	Ge	32	5.877E+08	1.5	1.850E+00
83	As	33	6.876E+09	0.6	1.340E+01
83	Se	34	5.725E+09	0.4	1.338E+03
83	Br	35	2.094E+10	0.3	8.640E+03
83	Rb	37	6.852E+06	3	7.448E+06
83	Sr	38	1.991E+06	23.2	1.167E+05
84	Ga	31	5.850E+03	11.5	8.500E-02
84	Ge	32	3.180E+08	1.9	1.200E+00
84	As	33	1.725E+09	0.9	5.500E+00
84	Se	34	1.477E+10	0.4	1.860E+02
84	Br	35	1.854E+10	0.3	1.908E+03
84	Rb	37	5.558E+07	1.6	2.831E+06
85	Ge	32	4.680E+07	3.7	5.800E-01
85	As	33	1.642E+09	1	2.028E+00
85	Se	34	7.203E+09	0.5	3.170E+01
85	Br	35	1.993E+10	0.3	1.740E+02
85	Kr	36	1.049E+07	0.3	3.392E+08
85	Sr	38	5.437E+06	4.1	5.602E+06
85	Y	39	6.748E+05	40.5	9.648E+03
85	Zr	40	1.640E+05	74.6	4.716E+02
86	As	33	4.078E+08	1.6	9.000E-01
86	Se	34	5.991E+09	0.6	1.530E+01
86	Br	35	1.449E+10	0.4	5.510E+01
86	Rb	37	8.363E+08	0.6	1.610E+06
86	Y	39	6.725E+06	14.5	5.306E+04
86	Zr	40	2.249E+05	99	5.940E+04
87	As	33	1.697E+08	2.2	7.300E-01

87	Se	34	2.372E+09	0.9	5.850E+00
87	Br	35	1.139E+10	0.4	5.560E+01
87	Kr	36	2.090E+10	0.3	4.578E+03
87	Y	39	5.908E+07	3.7	2.873E+05
87	Zr	40	2.249E+05	70	6.048E+03
88	Se	34	1.059E+09	1.1	1.520E+00
88	Br	35	7.127E+09	0.5	1.650E+01
88	Kr	36	1.930E+10	0.3	1.022E+04
88	Rb	37	2.722E+10	0.3	1.067E+03
88	Y	39	1.510E+07	2.6	9.215E+06
88	Zr	40	4.920E+05	17.5	7.206E+06
89	Se	34	1.060E+08	2	4.100E-01
89	Br	35	4.234E+09	0.7	4.400E+00
89	Kr	36	1.312E+10	0.4	1.890E+02
89	Rb	37	2.450E+10	0.3	9.090E+02
89	Sr	38	3.119E+09	0.3	4.366E+06
89	Zr	40	3.579E+07	5	2.823E+05
89	Nb	41	2.249E+05	70.4	6.840E+03
90	Br	35	1.442E+09	1.1	1.920E+00
90	Kr	36	9.466E+09	0.5	3.232E+01
90	Rb	37	1.386E+10	0.3	1.580E+02
90	Sr	38	1.592E+07	0.2	9.076E+08
90	Y	39	2.412E+09	0.6	2.308E+05
90	Nb	41	2.699E+06	20	5.256E+04
91	Se	34	4.819E+06	6.1	2.700E-01
91	Br	35	3.012E+08	1.4	5.410E-01
91	Kr	36	4.641E+09	0.6	8.570E+00
91	Rb	37	1.582E+10	0.3	5.840E+01
91	Sr	38	2.616E+10	0.3	3.467E+04
91	Y	39	2.726E+09	0.2	5.055E+06
92	Br	35	3.945E+07	2.6	3.430E-01
92	Kr	36	2.101E+09	0.8	1.840E+00
92	Rb	37	9.317E+09	0.5	4.510E+00
92	Sr	38	2.422E+10	0.3	9.756E+03
92	Y	39	3.282E+10	0.3	1.274E+04
93	Br	35	1.661E+05	3.6	1.020E-01
93	Kr	36	5.339E+08	1.5	1.286E+00
93	Rb	37	6.042E+09	0.5	5.840E+00
93	Sr	38	1.697E+10	0.4	4.454E+02
93	Y	39	3.007E+10	0.2	3.665E+04
94	Kr	36	1.831E+07	2	2.000E-01
94	Rb	37	2.462E+09	0.8	2.702E+00
94	Sr	38	1.278E+10	0.4	7.530E+01

94	Y	39	2.613E+10	0.3	1.122E+03
94	Tc	43	9.006E+05	34.8	1.758E+04
95	Kr	36	5.858E+07	3.7	7.800E-01
95	Rb	37	3.791E+08	1.2	3.770E-01
95	Sr	38	6.832E+09	0.5	2.390E+01
95	Y	39	2.150E+10	0.3	6.180E+02
95	Zr	40	2.828E+09	0.3	5.531E+06
95	Nb	41	7.581E+08	0.4	3.022E+06
95	Tc	43	3.943E+06	17.6	7.200E+04
96	Rb	37	2.216E+07	1.8	2.028E-01
96	Sr	38	2.566E+09	0.7	1.070E+00
96	Y	39	8.882E+09	0.4	5.340E+00
96	Nb	41	8.005E+09	0.5	8.406E+04
96	Tc	43	3.746E+07	4.8	3.698E+05
97	Rb	37	5.804E+06	2.4	1.699E-01
97	Sr	38	4.211E+08	1	4.290E-01
97	Y	39	5.689E+09	0.4	3.750E+00
97	Zr	40	2.464E+10	0.3	6.084E+04
97	Nb	41	3.939E+10	0.2	4.326E+03
97	Ru	44	3.067E+06	24.3	2.506E+05
98	Rb	37	1.248E+05	4.6	1.140E-01
98	Sr	38	4.525E+08	1.3	6.530E-01
98	Y	39	1.482E+09	0.6	5.480E-01
98	Zr	40	1.918E+10	0.3	3.070E+01
98	Nb	41	2.545E+10	0.3	2.860E+00
98	Rh	45	1.685E+05	73.8	5.220E+02
99	Sr	38	2.896E+07	2.4	2.710E-01
99	Y	39	2.448E+09	0.8	1.470E+00
99	Zr	40	9.748E+09	0.4	2.100E+00
99	Nb	41	1.718E+10	0.3	1.500E+01
99	Mo	42	3.668E+10	0.2	2.374E+05
99	Rh	45	1.641E+05	44.2	1.391E+06
100	Sr	38	7.346E+06	3.1	2.020E-01
100	Y	39	4.482E+08	1.2	7.350E-01
100	Zr	40	9.884E+09	0.4	7.100E+00
100	Nb	41	1.573E+10	0.3	1.500E+00
100	Tc	43	4.865E+09	0.6	1.580E+01
100	Rh	45	7.126E+06	11.7	7.488E+04
101	Sr	38	1.008E+05	7.8	1.180E-01
101	Y	39	1.939E+08	1.6	4.480E-01
101	Zr	40	3.765E+09	0.7	2.100E+00
101	Nb	41	2.074E+10	0.3	7.100E+00
101	Mo	42	3.978E+10	0.2	8.766E+02

101	Tc	43	5.155E+10	0.2	8.532E+02
101	Rh	45	1.702E+05	5.3	1.041E+08
101	Pd	46	6.748E+05	57.7	3.049E+04
102	Y	39	2.570E+07	2.9	3.600E-01
102	Zr	40	2.495E+09	0.9	2.900E+00
102	Nb	41	6.138E+09	0.5	1.300E+00
102	Mo	42	4.067E+10	0.2	6.780E+02
102	Tc	43	4.722E+10	0.2	5.280E+00
102	Rh	45	3.383E+06	2.9	1.788E+07
103	Zr	40	7.062E+08	1.3	1.300E+00
103	Nb	41	6.862E+09	0.5	1.500E+00
103	Mo	42	2.756E+10	0.3	6.750E+01
103	Tc	43	5.216E+10	0.2	5.420E+01
103	Ru	44	7.924E+09	0.2	3.392E+06
103	Pd	46	6.701E+06	9.6	1.468E+06
103	Ag	47	4.498E+05	50	3.942E+03
104	Zr	40	3.572E+08	1.8	1.200E+00
104	Nb	41	2.345E+09	0.7	4.800E+00
104	Mo	42	2.377E+10	0.3	6.000E+01
104	Tc	43	4.640E+10	0.2	1.098E+03
104	Rh	45	2.484E+09	0.7	4.230E+01
104	Ag	47	5.992E+05	39.4	4.152E+03
105	Nb	41	2.344E+09	0.9	2.950E+00
105	Mo	42	1.241E+10	0.5	3.560E+01
105	Tc	43	4.169E+10	0.2	4.560E+02
105	Ru	44	5.993E+10	0.2	1.598E+04
105	Rh	45	6.551E+10	0.2	1.273E+05
105	Ag	47	1.664E+06	8.6	3.567E+06
106	Nb	41	4.976E+08	1.6	1.020E+00
106	Mo	42	8.338E+09	0.5	8.400E+00
106	Tc	43	2.775E+10	0.3	3.600E+01
106	Ru	44	8.823E+08	0.2	3.228E+07
106	Rh	45	6.081E+09	0.4	2.980E+01
106	Ag	47	2.721E+07	6.3	1.438E+03
107	Nb	41	6.400E+07	2.1	3.300E-01
107	Mo	42	3.090E+09	0.8	3.500E+00
107	Tc	43	2.202E+10	0.3	2.120E+01
107	Ru	44	4.652E+10	0.2	2.250E+02
107	Rh	45	6.807E+10	0.2	1.302E+03
107	Cd	48	3.599E+06	24.2	2.340E+04
108	Mo	42	1.389E+09	1	1.500E+00
108	Tc	43	9.966E+09	0.5	5.170E+00
108	Ru	44	4.069E+10	0.2	2.730E+02

108	Rh	45	5.125E+10	0.2	1.680E+01
108	Ag	47	4.466E+08	1.6	1.422E+02
108	In	49	1.124E+05	99	3.480E+03
109	Mo	42	1.901E+08	1.8	5.300E-01
109	Tc	43	3.855E+09	0.5	8.700E-01
109	Ru	44	1.637E+10	0.3	3.450E+01
109	Rh	45	5.723E+10	0.2	8.000E+01
109	Pd	46	7.080E+10	0.1	4.932E+04
109	Cd	48	1.489E+06	2.4	3.997E+07
109	In	49	2.249E+06	17.9	1.512E+04
110	Mo	42	4.071E+07	2.3	3.000E-01
110	Tc	43	1.531E+09	0.9	9.200E-01
110	Ru	44	1.856E+10	0.4	1.460E+01
110	Rh	45	1.024E+10	0.3	3.200E+00
110	Ag	47	2.656E+09	0.6	2.460E+01
110	In	49	4.386E+06	16.5	1.764E+04
110	Sn	50	2.249E+05	99	1.480E+04
111	Tc	43	1.824E+08	1.1	3.000E-01
111	Ru	44	6.541E+09	0.5	2.120E+00
111	Rh	45	3.378E+10	0.3	1.100E+01
111	Pd	46	5.485E+10	0.2	1.404E+03
111	Ag	47	3.668E+10	0.2	6.437E+05
111	In	49	4.980E+07	4.5	2.423E+05
111	Sn	50	4.497E+05	70.9	2.118E+03
112	Tc	43	4.550E+07	1.9	2.800E-01
112	Ru	44	4.235E+09	0.6	1.750E+00
112	Rh	45	1.245E+10	0.4	3.800E+00
112	Pd	46	5.511E+10	0.2	7.571E+04
112	Ag	47	7.060E+10	0.2	1.127E+04
112	In	49	2.224E+08	2.3	8.982E+02
113	Tc	43	1.361E+06	2.9	1.300E-01
113	Ru	44	8.764E+08	1.1	8.000E-01
113	Rh	45	1.262E+10	0.4	2.720E+00
113	Pd	46	2.994E+10	0.2	9.300E+01
113	Ag	47	5.661E+10	0.1	1.933E+04
113	Sn	50	8.790E+05	7.8	9.944E+06
113	Sb	51	2.246E+05	99	4.002E+02
114	Ru	44	3.541E+08	1.4	5.700E-01
114	Rh	45	3.047E+09	0.6	1.850E+00
114	Pd	46	3.065E+10	0.3	1.452E+02
114	Ag	47	4.987E+10	0.2	4.600E+00
114	In	49	1.405E+09	0.7	7.190E+01
114	Sb	51	4.484E+05	70.6	2.094E+02



115	Ru	44	5.629E+07	2.7	4.000E-01
115	Rh	45	2.353E+09	0.7	9.900E-01
115	Pd	46	1.047E+10	0.4	2.500E+01
115	Ag	47	3.130E+10	0.2	1.200E+03
115	Cd	48	4.713E+10	0.2	1.925E+05
115	Sb	51	4.272E+06	23.3	1.926E+03
116	Rh	45	3.011E+08	1.3	6.800E-01
116	Pd	46	1.115E+10	0.4	1.180E+01
116	Ag	47	2.160E+10	0.3	1.608E+02
116	In	49	2.471E+09	0.5	1.410E+01
116	Sb	51	1.810E+07	7.4	9.480E+02
116	Te	52	4.499E+05	70.5	8.964E+03
117	Rh	45	1.673E+08	1.7	4.400E-01
117	Pd	46	3.753E+09	0.6	4.300E+00
117	Ag	47	1.224E+10	0.3	7.280E+01
117	Cd	48	2.260E+10	0.2	8.964E+03
117	In	49	4.259E+10	0.1	2.592E+03
117	Sb	51	1.880E+08	3.5	1.008E+04
117	Te	52	8.996E+05	35.1	3.720E+03
118	Pd	46	2.072E+09	1	2.400E+00
118	Ag	47	7.633E+09	0.4	3.760E+00
118	Cd	48	3.655E+10	0.2	3.018E+03
118	In	49	4.076E+10	0.2	5.000E+00
118	Sb	51	2.465E+08	2.2	2.160E+02
118	Te	52	8.005E+06	12.4	5.184E+05
119	Pd	46	4.034E+08	1.7	9.200E-01
119	Ag	47	3.847E+09	0.6	6.000E+00
119	Cd	48	1.069E+10	0.3	1.614E+02
119	In	49	2.267E+10	0.2	1.440E+02
119	Sb	51	1.647E+09	1.2	1.375E+05
119	Te	52	2.631E+07	6.3	5.771E+04
119	I	53	2.248E+05	99	1.146E+03
120	Pd	46	1.060E+08	2.2	5.000E-01
120	Ag	47	1.519E+09	0.7	1.230E+00
120	Cd	48	1.657E+10	0.4	5.080E+01
120	In	49	2.108E+10	0.3	3.080E+00
120	Sb	51	1.380E+09	0.9	9.534E+02
120	I	53	1.349E+06	28.3	4.860E+03
121	Ag	47	7.194E+08	1.1	7.800E-01
121	Cd	48	4.280E+09	0.6	1.350E+01
121	In	49	1.319E+10	0.3	2.310E+01
121	Sn	50	2.989E+10	0.2	9.742E+04
121	Te	52	9.692E+07	1.8	1.450E+06

121	I	53	2.227E+07	10.2	7.632E+03
122	Ag	47	8.539E+07	2.2	5.600E-01
122	Cd	48	4.360E+09	0.7	5.300E+00
122	In	49	6.948E+09	0.5	1.500E+00
122	Sb	51	6.669E+09	0.4	2.333E+05
122	I	53	8.297E+07	5.2	2.178E+02
122	Xe	54	1.348E+06	40.4	7.236E+04
123	Ag	47	2.895E+07	2.8	3.090E-01
123	Cd	48	1.075E+09	0.9	2.100E+00
123	In	49	5.368E+09	0.4	5.980E+00
123	Sn	50	2.588E+08	0.4	1.116E+07
123	I	53	3.581E+08	2.7	4.777E+04
123	Xe	54	4.498E+06	22.6	7.488E+03
124	Ag	47	3.155E+06	5.4	2.200E-01
124	Cd	48	5.598E+08	1.4	1.240E+00
124	In	49	2.499E+09	0.7	3.170E+00
124	Sb	51	7.770E+08	0.3	5.201E+06
124	I	53	5.536E+08	1.8	3.612E+05
125	Cd	48	5.353E+07	2.9	6.500E-01
125	In	49	1.267E+09	0.9	2.360E+00
125	Sn	50	2.090E+09	0.5	8.329E+05
125	Sb	51	1.097E+08	0.3	8.698E+07
125	I	53	1.947E+08	1	5.133E+06
125	Xe	54	1.246E+08	3	6.084E+04
125	Cs	55	2.024E+06	32.8	2.700E+03
126	Cd	48	3.618E+07	3.8	5.060E-01
126	In	49	3.252E+08	1.4	1.600E+00
126	Sb	51	1.409E+09	0.4	1.077E+06
126	I	53	9.953E+08	0.9	1.133E+06
126	Cs	55	9.828E+06	15.1	9.840E+01
127	Cd	48	7.035E+06	6.9	4.000E-01
127	In	49	1.806E+08	1.8	1.150E+00
127	Sn	50	1.575E+09	0.8	7.560E+03
127	Sb	51	9.838E+09	0.4	3.326E+05
127	Te	52	1.222E+10	0.3	3.366E+04
127	Xe	54	1.304E+08	1.1	3.145E+06
127	Cs	55	5.691E+07	5.9	2.250E+04
128	Cd	48	1.293E+06	10.9	2.800E-01
128	In	49	4.956E+07	3.3	8.000E-01
128	Sn	50	1.988E+09	0.8	3.546E+03
128	Sb	51	2.908E+09	0.6	3.244E+04
128	I	53	5.632E+09	0.6	1.499E+03
128	Cs	55	1.664E+08	3.5	2.172E+02

128	Ba	56	4.242E+06	20.9	2.100E+05
129	In	49	1.587E+07	5	6.300E-01
129	Sn	50	4.275E+08	1.6	1.440E+02
129	Sb	51	3.238E+09	0.6	1.584E+04
129	Te	52	9.199E+09	0.3	4.176E+03
129	Cs	55	5.229E+08	2	1.154E+05
129	Ba	56	8.772E+06	11.1	8.028E+03
129	La	57	4.496E+05	50	6.960E+02
130	Cd	48	3.108E+04	39.8	2.000E-01
130	In	49	1.257E+06	10.8	3.200E-01
130	Sn	50	2.439E+08	1.9	2.232E+02
130	Sb	51	1.500E+09	0.8	2.370E+03
130	I	53	6.624E+09	0.4	4.450E+04
130	Cs	55	8.867E+08	1.1	1.753E+03
130	La	57	1.123E+06	44.4	5.220E+02
131	In	49	3.665E+05	10.3	2.700E-01
131	Sn	50	9.840E+07	2.9	6.100E+01
131	Sb	51	2.040E+09	0.9	1.380E+03
131	Te	52	5.029E+09	0.5	1.500E+03
131	I	53	8.215E+09	0.4	6.947E+05
131	Cs	55	8.590E+08	1.1	8.372E+05
131	Ba	56	8.106E+07	2.5	1.020E+06
131	La	57	9.896E+06	15.8	3.540E+03
132	In	49	1.180E+05	22.5	2.010E-01
132	Sn	50	1.662E+08	2.9	3.970E+01
132	Sb	51	3.595E+08	1.7	1.674E+02
132	Te	52	4.594E+09	0.6	2.768E+05
132	I	53	1.158E+10	0.3	8.262E+03
132	Cs	55	1.394E+09	1	5.598E+05
132	La	57	2.437E+07	6.3	1.728E+04
132	Ce	58	2.249E+05	99	1.264E+04
133	In	49	6.655E+03	57.4	1.800E-01
133	Sn	50	3.224E+07	4.8	1.440E+00
133	Sb	51	5.980E+08	1	1.500E+02
133	Te	52	1.744E+09	0.7	7.500E+02
133	I	53	1.163E+10	0.3	7.488E+04
133	Xe	54	1.076E+10	0.2	4.530E+05
133	Ba	56	1.276E+06	1.1	3.318E+08
133	La	57	1.048E+08	4.6	1.408E+04
133	Ce	58	3.374E+05	57.5	5.820E+03
134	Sn	50	6.585E+06	9.4	1.040E+00
134	Sb	51	4.109E+07	3.2	8.500E-01
134	Te	52	1.909E+09	0.9	2.508E+03

134	I	53	7.345E+09	0.4	3.156E+03
134	Cs	55	3.476E+07	0.5	6.503E+07
134	La	57	2.367E+08	3.1	3.870E+02
134	Ce	58	1.060E+07	13.2	2.732E+05
135	Sb	51	6.320E+07	4	1.679E+00
135	Te	52	7.078E+08	1.6	1.900E+01
135	I	53	5.465E+09	0.6	2.365E+04
135	Xe	54	1.377E+10	0.3	3.290E+04
135	La	57	6.076E+08	1.8	7.020E+04
135	Ce	58	4.069E+07	5.7	6.372E+04
135	Pr	59	8.993E+05	60.9	1.440E+03
136	Sb	51	1.091E+07	7.1	8.200E-01
136	Te	52	4.542E+08	1.8	1.750E+01
136	I	53	1.232E+09	1	8.340E+01
136	Cs	55	2.197E+09	0.4	1.137E+06
136	La	57	8.321E+08	1.1	5.922E+02
136	Pr	59	3.821E+06	24.8	7.860E+02
137	Te	52	9.946E+07	3.4	2.490E+00
137	I	53	1.283E+09	1.2	2.450E+01
137	Xe	54	4.806E+09	0.7	2.291E+02
137	Cs	55	8.210E+06	0.4	9.492E+08
137	Ce	58	2.642E+08	2	3.240E+04
137	Pr	59	2.317E+07	9.4	4.608E+03
137	Nd	60	2.249E+05	70	2.310E+03
138	Te	52	4.776E+07	4.3	1.400E+00
138	I	53	7.265E+08	1.5	6.490E+00
138	Xe	54	4.097E+09	0.7	8.448E+02
138	Cs	55	9.632E+09	0.4	2.005E+03
138	Pr	59	2.310E+07	7.6	8.700E+01
138	Nd	60	2.249E+05	99	1.814E+04
139	I	53	3.003E+08	2.1	2.290E+00
139	Xe	54	1.929E+09	1	3.968E+01
139	Cs	55	8.247E+09	0.5	5.562E+02
139	Ba	56	1.448E+10	0.4	4.984E+03
139	Ce	58	3.958E+07	1.1	1.189E+07
139	Pr	59	1.361E+08	3.9	1.588E+04
139	Nd	60	2.137E+06	22.4	1.782E+03
140	I	53	6.250E+07	3.3	8.600E-01
140	Xe	54	1.391E+09	1.1	1.360E+01
140	Cs	55	5.115E+09	0.7	6.370E+01
140	Ba	56	4.635E+09	0.4	1.102E+06
140	La	57	7.401E+09	0.4	1.450E+05
140	Pr	59	2.478E+08	3	2.034E+02

140	Nd	60	2.051E+07	8.9	2.912E+05
140	Pm	61	3.129E+05	57.6	9.200E+00
141	I	53	9.873E+06	5.7	4.300E-01
141	Xe	54	4.235E+08	1.5	1.730E+00
141	Cs	55	3.563E+09	0.7	2.494E+01
141	Ba	56	8.863E+09	0.5	1.096E+03
141	La	57	1.522E+10	0.4	1.411E+04
141	Ce	58	2.618E+09	0.3	2.808E+06
141	Nd	60	5.195E+07	4.6	8.964E+03
141	Pm	61	1.799E+06	34.9	1.254E+03
142	I	53	2.867E+05	14.5	2.000E-01
142	Xe	54	1.893E+08	2.3	1.220E+00
142	Cs	55	1.324E+09	1	1.700E+00
142	Ba	56	7.071E+09	0.5	6.360E+02
142	La	57	1.265E+10	0.4	5.466E+03
142	Pr	59	6.079E+08	1.3	6.883E+04
142	Pm	61	5.749E+06	18.6	4.050E+01
143	Xe	54	6.243E+06	5.2	3.000E-01
143	Cs	55	7.816E+08	1.3	1.780E+00
143	Ba	56	3.694E+09	0.8	1.433E+01
143	La	57	1.011E+10	0.5	8.520E+02
143	Ce	58	1.319E+10	0.4	1.189E+05
143	Pr	59	3.900E+09	0.4	1.172E+06
143	Pm	61	5.962E+05	8.1	2.290E+07
143	Sm	62	1.123E+06	25.6	5.298E+02
144	Xe	54	1.848E+07	6.2	1.150E+00
144	Cs	55	1.424E+08	2	1.010E+00
144	Ba	56	2.705E+09	0.7	1.150E+01
144	La	57	6.767E+09	0.5	4.080E+01
144	Ce	58	2.274E+08	0.4	2.461E+07
144	Pr	59	1.651E+09	0.7	1.037E+03
144	Pm	61	5.558E+05	8	3.136E+07
145	Xe	54	2.667E+06	18.3	9.000E-01
145	Cs	55	6.378E+07	3.1	5.940E-01
145	Ba	56	1.068E+09	1.2	4.310E+00
145	La	57	4.933E+09	0.6	2.480E+01
145	Ce	58	8.599E+09	0.5	1.806E+02
145	Pr	59	1.099E+10	0.4	2.154E+04
145	Pm	61	7.049E+04	5.3	5.582E+08
145	Sm	62	1.203E+05	16.6	2.938E+07
145	Eu	63	4.099E+05	57.6	5.124E+05
146	Cs	55	5.649E+06	6.6	3.430E-01
146	Ba	56	4.904E+08	1.6	2.220E+00

146	La	57	1.445E+09	1	6.270E+00
146	Ce	58	6.817E+09	0.5	8.112E+02
146	Pr	59	9.071E+09	0.5	1.449E+03
146	Pm	61	2.993E+05	4.5	1.744E+08
146	Eu	63	4.732E+05	57.5	3.966E+05
147	Cs	55	4.832E+05	14.5	2.250E-01
147	Ba	56	1.085E+08	2.7	8.930E-01
147	La	57	1.483E+09	1.1	4.015E+00
147	Ce	58	4.092E+09	0.7	5.640E+01
147	Pr	59	7.250E+09	0.6	8.040E+02
147	Nd	60	3.225E+09	0.5	9.487E+05
147	Pm	61	1.136E+07	0.6	8.273E+07
147	Eu	63	5.548E+05	28.2	2.082E+06
148	Cs	55	1.257E+04	45.6	1.580E-01
148	Ba	56	2.157E+07	5.6	6.070E-01
148	La	57	3.131E+08	2	1.050E+00
148	Ce	58	2.776E+09	0.9	5.600E+01
148	Pr	59	3.985E+09	0.7	1.362E+02
148	Pm	61	8.912E+07	3	4.640E+05
148	Eu	63	6.746E+05	17.5	4.709E+06
149	Ba	56	2.174E+06	11.3	3.560E-01
149	La	57	1.949E+08	2.5	1.200E+00
149	Ce	58	1.171E+09	1.3	5.200E+00
149	Pr	59	3.714E+09	0.8	1.356E+02
149	Nd	60	5.005E+09	0.7	6.192E+03
149	Pm	61	5.019E+09	0.6	1.911E+05
149	Eu	63	8.160E+05	12	8.044E+06
149	Gd	64	3.007E+05	57.6	8.122E+05
150	Ba	56	2.783E+05	29.7	3.000E-01
150	La	57	1.401E+07	5.7	4.000E-01
150	Ce	58	6.337E+08	1.7	4.000E+00
150	Pr	59	1.978E+09	1	6.190E+00
150	Pm	61	4.825E+08	2.1	9.648E+03
151	Ce	58	1.216E+08	3	1.020E+00
151	Pr	59	1.363E+09	1.2	1.890E+01
151	Nd	60	2.594E+09	0.9	7.464E+02
151	Pm	61	3.379E+09	0.8	1.022E+05
151	Sm	62	4.767E+05	0.8	2.838E+09
151	Gd	64	1.771E+05	22.7	1.071E+07
152	Ce	58	7.850E+07	5.2	3.100E+00
152	Pr	59	4.479E+08	2	3.240E+00
152	Nd	60	1.750E+09	1.1	6.840E+02
152	Pm	61	1.987E+09	1	2.460E+02

152	Eu	63	3.643E+04	5.2	4.271E+08
152	Tb	65	2.011E+05	70.5	6.300E+04
153	Pr	59	2.480E+08	2.8	4.300E+00
153	Nd	60	8.404E+08	1.7	2.890E+01
153	Pm	61	1.681E+09	1.2	3.240E+02
153	Sm	62	1.813E+09	1.1	1.666E+05
153	Gd	64	3.634E+05	11.7	2.087E+07
153	Tb	65	2.039E+06	31.1	2.022E+05
154	Pr	59	6.063E+07	5.3	2.300E+00
154	Nd	60	4.885E+08	2.1	2.590E+01
154	Pm	61	7.759E+08	1.5	1.038E+02
154	Eu	63	1.414E+05	3.5	2.710E+08
154	Tb	65	1.664E+06	22	7.740E+04
155	Nd	60	1.647E+08	3.5	8.900E+00
155	Pm	61	6.138E+08	1.9	4.800E+01
155	Sm	62	9.172E+08	1.6	1.338E+03
155	Eu	63	3.248E+06	1.5	1.476E+08
155	Tb	65	6.824E+06	14.6	4.596E+05
155	Dy	66	6.748E+05	57.4	3.600E+04
156	Nd	60	7.321E+07	5.3	5.470E+00
156	Pm	61	2.934E+08	2.7	2.670E+01
156	Sm	62	6.065E+08	2	3.384E+04
156	Eu	63	2.079E+08	1.8	1.312E+06
156	Tb	65	3.998E+06	9.7	4.622E+05
157	Pm	61	1.287E+08	3.9	1.090E+01
157	Sm	62	3.182E+08	2.5	4.842E+02
157	Eu	63	4.552E+08	2.1	5.465E+04
157	Dy	66	3.149E+06	20.5	2.930E+04
157	Ho	67	2.247E+05	99	7.560E+02
158	Pm	61	4.819E+07	6.5	4.800E+00
158	Sm	62	1.810E+08	3.6	3.306E+02
158	Eu	63	2.834E+08	2.9	2.754E+03
158	Ho	67	1.356E+05	70.4	6.780E+02
159	Sm	62	7.189E+07	5.4	1.120E+01
159	Eu	63	1.650E+08	3.7	1.086E+03
159	Gd	64	2.043E+08	3.3	6.682E+04
159	Dy	66	2.371E+05	19.6	1.248E+07
159	Ho	67	8.996E+05	35.2	1.983E+03
160	Sm	62	2.626E+07	8.4	9.600E+00
160	Eu	63	7.349E+07	5.3	3.800E+01
160	Tb	65	1.079E+06	12.9	6.247E+06
160	Ho	67	2.384E+06	16.6	1.536E+03
161	Eu	63	4.030E+07	7.2	2.600E+01

161	Gd	64	6.964E+07	5.6	2.196E+02
161	Tb	65	4.828E+07	5.1	5.944E+05
161	Ho	67	5.173E+06	14.4	8.928E+03
161	Er	68	2.249E+05	99	1.156E+04
162	Eu	63	1.686E+07	11.5	1.060E+01
162	Gd	64	3.889E+07	7.6	5.040E+02
162	Tb	65	5.284E+07	6.5	4.560E+02
162	Ho	67	4.553E+06	13.8	9.000E+02
163	Gd	64	1.915E+07	10.9	6.800E+01
163	Tb	65	3.104E+07	8.7	1.170E+03
163	Er	68	1.349E+06	47	4.500E+03
163	Tm	69	2.249E+05	99	6.516E+03
164	Gd	64	5.538E+06	20.3	4.500E+01
164	Tb	65	1.078E+07	14.9	1.800E+02
164	Ho	67	6.522E+06	13.3	1.740E+03
164	Tm	69	6.055E+05	40.9	1.200E+02
165	Gd	64	1.992E+06	32.9	4.230E+01
165	Tb	65	4.485E+06	21.9	1.266E+02
165	Dy	66	6.892E+06	16.1	8.402E+03
165	Er	68	3.354E+06	25.4	3.730E+04
165	Tm	69	1.111E+06	44.3	1.082E+05
166	Tb	65	1.778E+06	39.2	5.640E+01
166	Dy	66	3.075E+06	26.7	2.938E+05
166	Ho	67	3.679E+06	21.4	9.659E+04
166	Tm	69	1.575E+06	37.4	2.772E+04
167	Dy	66	2.694E+06	28.5	3.720E+02
167	Ho	67	4.724E+06	22.5	1.116E+04
167	Tm	69	1.623E+06	27.4	7.992E+05
167	Yb	70	2.248E+05	98.9	1.050E+03
168	Dy	66	1.797E+06	34.9	5.100E+02
168	Ho	67	2.024E+06	32.9	1.794E+02
168	Tm	69	1.041E+05	34.8	8.044E+06
169	Dy	66	4.420E+05	70.8	3.900E+01
169	Ho	67	1.123E+06	44.6	2.820E+02
169	Er	68	8.017E+05	35.3	8.122E+05
169	Yb	70	1.702E+05	31.7	2.767E+06
169	Lu	71	2.204E+05	70	1.226E+05
170	Dy	66	2.174E+05	99	2.040E+01
170	Ho	67	4.489E+05	60.9	1.656E+02
170	Tm	69	6.645E+04	37.3	1.111E+07
170	Lu	71	2.109E+05	70	1.728E+05
171	Ho	67	4.440E+05	70.9	5.300E+01
171	Er	68	8.998E+05	50.1	2.706E+04



171	Tm	69	8.465E+03	44.7	6.055E+07
171	Lu	71	2.203E+05	49.8	7.119E+05
172	Lu	71	3.810E+05	40.6	5.789E+05
173	Er	68	2.231E+05	99	8.400E+01
173	Tm	69	8.998E+05	49.8	2.966E+04
173	Lu	71	9.486E+03	50	4.320E+07
173	Hf	72	2.241E+05	99	8.496E+04
174	Tm	69	4.489E+05	70.5	3.240E+02
175	Tm	69	2.248E+05	98.9	9.120E+02
175	Yb	70	4.953E+05	57.4	3.616E+05
175	Hf	72	5.009E+04	57.4	6.048E+06
175	Ta	73	2.249E+05	99	3.780E+04
176	Ta	73	2.249E+05	98.9	2.912E+04
177	Yb	70	2.249E+05	70	6.880E+03
177	Lu	71	1.884E+05	57.1	5.818E+05
177	Ta	73	2.036E+05	99	2.036E+05
178	Lu	71	1.124E+05	99	1.704E+03
178	Ta	73	1.123E+05	99	5.586E+02
179	Lu	71	2.249E+05	99	1.652E+04
179	Ta	73	5.694E+03	52.6	5.645E+07
179	W	74	2.246E+05	70	2.250E+03
182	Re	75	9.841E+04	99	2.304E+05
184	Re	75	3.093E+04	70.1	3.283E+06
185	Ta	73	2.249E+05	99	2.940E+03
185	W	74	1.592E+04	99	6.489E+06
185	Os	76	1.294E+04	99	8.087E+06
189	Ir	77	1.489E+05	44.9	1.140E+06
189	Pt	78	2.249E+05	70	3.913E+04
189	Au	79	1.124E+05	99	1.722E+03
190	Ir	77	5.766E+04	68.2	1.018E+06
190	Au	79	4.498E+05	49.6	2.568E+03
191	Pt	78	1.530E+06	32.7	2.506E+05
191	Au	79	4.499E+05	49.5	1.145E+04
191	Hg	80	1.124E+05	99	2.940E+03
192	Au	79	5.174E+06	21.3	1.778E+04
192	Hg	80	2.474E+06	32.2	1.746E+04
193	Au	79	9.871E+06	10.5	6.354E+04
193	Hg	80	4.849E+06	14.7	1.368E+04
193	Tl	81	2.399E+06	19.4	1.296E+03
194	Au	79	2.182E+06	34.1	1.369E+05
194	Tl	81	2.474E+06	21.5	1.980E+03
194	Pb	82	2.247E+05	99	7.200E+02
195	Au	79	5.527E+05	7	1.608E+07

195	Hg	80	1.717E+07	7.5	3.564E+04
195	Tl	81	9.338E+06	10.4	4.176E+03
195	Pb	82	3.400E+05	50.5	9.000E+02
196	Au	79	9.174E+05	21.6	5.342E+05
196	Tl	81	7.821E+06	14.3	6.624E+03
196	Pb	82	3.824E+06	23.8	2.220E+03
197	Pt	78	4.421E+05	49.9	6.588E+04
197	Hg	80	2.241E+07	6.6	2.309E+05
197	Tl	81	2.161E+07	7.3	1.022E+04
197	Pb	82	5.759E+06	12	4.800E+02
197	Bi	83	7.887E+05	37.2	5.580E+02
198	Au	79	3.427E+05	50.4	2.327E+05
198	Tl	81	2.000E+07	7.9	1.908E+04
198	Pb	82	1.286E+07	11.1	8.640E+03
198	Bi	83	2.320E+06	20.4	7.110E+02
199	Pt	78	2.249E+05	70	1.848E+03
199	Au	79	3.727E+05	60.6	2.712E+05
199	Tl	81	3.477E+07	5.2	2.671E+04
199	Pb	82	2.696E+07	5.8	5.400E+03
199	Bi	83	1.145E+07	8.4	1.620E+03
199	Po	84	2.292E+05	69.5	3.120E+02
200	Tl	81	3.768E+07	6	9.396E+04
200	Pb	82	3.448E+07	6.4	7.740E+04
200	Bi	83	1.264E+07	7.9	2.184E+03
200	Po	84	3.003E+06	26.3	6.900E+02
201	Tl	81	5.155E+07	3.2	2.625E+05
201	Pb	82	6.079E+07	3.2	3.359E+04
201	Bi	83	4.874E+07	3.2	6.480E+03
201	Po	84	6.448E+06	12	9.180E+02
202	Tl	81	3.451E+05	41.4	1.057E+06
202	Bi	83	9.100E+07	4.2	6.192E+03
202	Po	84	7.714E+07	4.6	2.682E+03
202	At	85	2.469E+06	22.8	1.810E+02
203	Hg	80	2.523E+04	99	4.027E+06
203	Pb	82	2.531E+08	1.4	1.867E+05
203	Bi	83	2.771E+08	1.4	4.234E+04
203	Po	84	1.174E+08	2.4	2.202E+03
203	At	85	1.995E+07	10.1	4.440E+02
204	Bi	83	8.679E+08	1.2	4.039E+04
204	Po	84	8.582E+08	1.2	1.271E+04
204	At	85	7.370E+07	5	5.520E+02
204	Rn	86	4.457E+05	70.6	7.440E+01
205	Bi	83	2.720E+08	1	1.323E+06

205	Po	84	6.491E+08	1.3	5.976E+03
205	At	85	3.377E+08	2.5	1.614E+03
205	Rn	86	6.801E+06	17.7	1.680E+02
206	Tl	81	1.808E+06	27.5	2.519E+02
206	Bi	83	6.989E+08	0.7	5.394E+05
206	Po	84	2.019E+09	0.7	7.603E+05
206	At	85	5.180E+08	1.6	1.800E+03
206	Rn	86	9.837E+07	5	3.402E+02
207	Tl	81	1.886E+10	0.3	2.862E+02
207	Bi	83	3.238E+06	0.4	9.950E+08
207	Po	84	2.644E+09	0.7	2.088E+04
207	At	85	1.720E+09	1.1	6.480E+03
207	Rn	86	4.130E+08	2.3	5.550E+02
207	Fr	87	9.666E+06	15.4	1.480E+01
208	Tl	81	4.387E+09	0.4	1.832E+02
208	Po	84	3.976E+07	0.5	9.139E+07
208	At	85	1.440E+09	0.7	5.868E+03
208	Rn	86	1.218E+09	1.2	1.461E+03
208	Fr	87	6.298E+07	6	5.910E+01
209	Tl	81	1.621E+08	0.3	1.320E+02
209	Pb	82	2.664E+10	0.3	1.171E+04
209	Po	84	1.592E+06	0.4	3.217E+09
209	At	85	6.266E+09	0.5	1.948E+04
209	Rn	86	1.876E+09	0.7	1.710E+03
209	Fr	87	3.219E+08	2.7	5.000E+01
209	Ra	88	3.289E+06	24.9	4.600E+00
210	Pb	82	2.448E+07	0.3	7.033E+08
210	Bi	83	8.774E+09	0.3	4.331E+05
210	Po	84	6.812E+08	0.3	1.196E+07
210	At	85	5.367E+09	0.6	2.916E+04
210	Rn	86	3.989E+09	0.8	8.640E+03
210	Fr	87	7.131E+08	1.7	1.908E+02
210	Ra	88	7.232E+07	5.4	3.700E+00
211	Pb	82	2.698E+09	0.3	2.166E+03
211	Bi	83	1.891E+10	0.3	1.284E+02
211	Po	84	1.159E+10	0.3	5.160E-01
211	At	85	1.128E+10	0.4	2.597E+04
211	Rn	86	3.839E+09	0.7	5.256E+04
211	Fr	87	1.663E+09	1.2	1.860E+02
211	Ra	88	3.742E+08	2.4	1.300E+01
211	Ac	89	2.812E+04	70.8	2.500E-01
212	Pb	82	1.084E+10	0.4	3.830E+04
212	Bi	83	1.221E+10	0.4	3.633E+03

212	Po	84	1.309E+10	0.3	2.990E-07
212	At	85	1.078E+09	0.5	3.140E-01
212	Rn	86	6.200E+09	0.6	1.434E+03
212	Fr	87	2.176E+09	0.8	1.200E+03
212	Ra	88	1.213E+09	1.2	1.300E+01
212	Ac	89	1.217E+07	9.5	9.300E-01
213	Pb	82	1.881E+05	49.6	6.120E+02
213	Bi	83	7.755E+09	0.3	2.735E+03
213	Po	84	2.654E+10	0.3	4.200E-06
213	At	85	3.089E+07	6.8	1.250E-07
213	Rn	86	2.535E+07	0.7	2.500E-02
213	Fr	87	4.605E+09	0.7	3.460E+01
213	Ra	88	2.051E+09	0.7	1.644E+02
213	Ac	89	7.254E+07	3.7	8.000E-01
214	Pb	82	1.386E+06	34.5	1.608E+03
214	Bi	83	1.609E+06	32.8	1.194E+03
214	Po	84	3.824E+10	0.2	1.643E-04
214	At	85	1.193E+10	0.3	5.580E-07
214	Fr	87	1.573E+06	0.8	5.000E-03
214	Ra	88	2.617E+09	0.8	2.460E+00
214	Ac	89	4.622E+08	2.1	8.200E+00
214	Th	90	5.711E+03	22.9	1.000E-01
215	Bi	83	2.218E+05	97.4	4.560E+02
215	Po	84	2.715E+09	0.3	1.781E-03
215	At	85	1.588E+10	0.4	1.000E-04
215	Rn	86	2.053E+09	0.6	2.300E-06
215	Ra	88	1.834E+04	1.4	1.590E-03
215	Ac	89	2.018E+07	1.4	1.700E-01
215	Th	90	3.863E+07	6.4	1.200E+00
216	Po	84	1.132E+10	0.4	1.450E-01
216	At	85	1.407E+09	0.6	3.000E-04
216	Rn	86	5.268E+09	0.5	4.500E-05
216	Fr	87	1.738E+07	7.6	7.000E-07
216	Pa	91	7.029E+03	99	2.000E-01
217	Po	84	1.979E+05	49.6	1.000E+01
217	At	85	7.788E+09	0.3	3.230E-02
217	Rn	86	1.895E+10	0.3	5.400E-04
217	Fr	87	3.089E+07	6.8	2.200E-05
218	Po	84	1.388E+06	34.5	1.860E+02
218	At	85	1.461E+05	98.8	1.600E+00
218	Rn	86	3.823E+10	0.2	3.500E-02
218	Fr	87	1.193E+10	0.3	1.000E-03
219	At	85	2.259E+05	97.4	5.600E+01

219	Rn	86	2.715E+09	0.3	3.960E+00
219	Fr	87	1.588E+10	0.4	2.000E-02
219	Ra	88	2.053E+09	0.6	1.000E-02
220	Rn	86	1.132E+10	0.4	5.560E+01
220	Fr	87	1.412E+09	0.6	2.740E+01
220	Ra	88	5.267E+09	0.5	2.500E-02
220	Ac	89	1.738E+07	7.6	2.610E-02
221	Rn	86	8.994E+05	49.6	1.500E+03
221	Fr	87	7.796E+09	0.3	2.940E+02
221	Ra	88	1.895E+10	0.3	2.800E+01
221	Ac	89	3.089E+07	6.8	5.200E-02
222	Rn	86	1.388E+06	34.5	3.304E+05
222	Fr	87	7.448E+07	5.5	8.520E+02
222	Ra	88	3.823E+10	0.2	3.800E+01
222	Ac	89	6.462E+09	0.4	5.000E+00
223	Rn	86	4.497E+05	70.7	1.392E+03
223	Fr	87	6.152E+07	5.8	1.308E+03
223	Ra	88	2.709E+09	0.3	9.880E+05
223	Ac	89	1.604E+10	0.4	1.260E+02
223	Th	90	2.019E+09	0.6	6.000E-01
224	Rn	86	2.249E+05	99	6.420E+03
224	Fr	87	2.892E+07	9.4	1.980E+02
224	Ra	88	1.132E+10	0.4	3.162E+05
224	Ac	89	1.394E+10	0.4	1.044E+04
224	Th	90	5.142E+09	0.5	1.050E+00
224	Pa	91	1.692E+07	7.6	9.500E-01
225	Rn	86	2.244E+05	99	2.700E+02
225	Fr	87	2.108E+07	10.3	2.400E+02
225	Ra	88	3.314E+08	1.5	1.287E+06
225	Ac	89	7.669E+09	0.3	8.640E+05
225	Th	90	1.820E+10	0.4	5.232E+02
225	Pa	91	2.992E+07	6.8	1.700E+00
226	Fr	87	6.430E+06	18.2	4.800E+01
226	Ra	88	2.485E+04	0.6	5.046E+10
226	Ac	89	1.262E+10	0.4	1.058E+05
226	Th	90	3.513E+10	0.3	1.836E+03
226	Pa	91	3.013E+08	2.6	1.080E+02
227	Fr	87	3.806E+06	23.4	1.482E+02
227	Ra	88	4.628E+08	2.2	2.532E+03
227	Ac	89	1.012E+07	0.4	6.866E+08
227	Th	90	8.962E+09	0.2	1.617E+06
227	Pa	91	3.767E+08	2.3	2.298E+03
228	Fr	87	1.105E+06	44.2	3.900E+01

228	Ra	88	1.028E+06	2.6	1.813E+08
228	Ac	89	9.722E+09	0.5	2.214E+04
228	Th	90	5.314E+08	0.2	6.033E+07
228	Pa	91	1.995E+09	1.1	7.920E+04
229	Ra	88	1.830E+08	3.5	2.400E+02
229	Ac	89	1.105E+10	0.5	3.762E+03
229	Th	90	1.301E+05	0.2	2.315E+11
229	Pa	91	2.703E+09	0.9	1.296E+05
230	Ra	88	1.037E+08	4.8	5.580E+03
230	Ac	89	6.612E+09	0.6	1.220E+02
230	Th	90	1.847E+04	0.1	2.377E+12
230	Pa	91	2.392E+09	0.5	1.503E+06
230	U	92	2.580E+07	0.5	1.797E+06
231	Ac	89	1.142E+10	0.5	4.500E+02
231	Th	90	8.201E+10	0.2	9.187E+04
231	Pa	91	3.384E+04	0.2	1.033E+12
231	U	92	6.595E+05	49.7	3.629E+05
232	Ac	89	6.105E+07	5.9	1.190E+02
232	Pa	91	2.365E+09	0.9	1.132E+05
232	U	92	4.060E+05	0.9	2.173E+09
233	Th	90	6.885E+09	0.4	1.338E+03
233	Pa	91	1.278E+09	0.4	2.330E+06

#### Isomers

26	Al	13	3.025E+05	57.7	6.345E+00
34	Cl	17	7.870E+05	42.4	1.920E+03
38	Cl	17	8.532E+04	70.3	7.150E-01
38	K	19	2.125E+05	49.6	9.239E-01
42	Sc	21	4.449E+05	49.7	6.170E+01
44	Sc	21	5.850E+06	12.8	2.110E+05
45	Sc	21	6.359E+05	13.9	3.180E-01
46	Sc	21	2.059E+06	22.1	1.875E+01
50	Sc	21	9.313E+04	40.4	3.500E-01
50	Mn	25	2.235E+05	71	1.050E+02
52	Mn	25	6.745E+05	40.4	1.266E+03
58	Mn	25	6.009E+06	13.4	6.530E+01
60	Mn	25	5.778E+06	11.4	1.770E+00
60	Co	27	3.033E+06	18.2	6.280E+02
62	Co	27	1.629E+07	8.1	8.346E+02
68	Cu	29	1.383E+08	3.1	2.250E+02
69	Zn	30	9.278E+07	3.3	4.954E+04
70	Cu	29	2.507E+08	2.1	3.300E+01
71	Zn	30	3.122E+08	1.9	1.426E+04

73	Zn	30	4.974E+08	1.3	5.800E+00
73	Ge	32	3.313E+09	0.7	4.990E-01
74	Ga	31	2.573E+09	0.7	9.500E+00
75	Ge	32	6.183E+08	1.3	4.770E+01
76	Br	35	1.988E+05	57.6	1.310E+00
77	Zn	30	1.657E+08	1.9	1.050E+00
77	Ge	32	5.372E+09	0.6	5.290E+01
77	Se	34	1.133E+08	3	1.736E+01
77	Br	35	6.057E+06	12.6	2.568E+02
78	Rb	37	2.245E+05	70.6	3.444E+02
79	Ge	32	1.979E+09	0.8	3.900E+01
79	Se	34	1.182E+10	0.4	2.352E+02
79	Br	35	9.118E+07	3.1	4.860E+00
79	Kr	36	2.884E+06	19.4	5.000E+01
80	Br	35	2.559E+08	2.1	1.591E+04
81	Ge	32	1.435E+09	0.8	7.600E+00
81	Se	34	2.430E+09	0.7	3.437E+03
81	Kr	36	5.728E+07	4	1.310E+01
81	Rb	37	2.698E+06	19.4	1.830E+03
82	As	33	2.570E+09	0.6	1.360E+01
82	Br	35	1.434E+09	0.9	3.678E+02
82	Rb	37	8.210E+06	11.8	2.330E+04
83	Se	34	8.575E+09	0.4	7.010E+01
83	Kr	36	2.154E+10	0.3	6.588E+03
83	Sr	38	8.800E+05	32.9	4.950E+00
84	As	33	4.714E+08	1	6.500E-01
84	Br	35	3.723E+09	0.6	3.600E+02
84	Rb	37	1.786E+08	2.2	1.216E+03
85	Kr	36	2.262E+10	0.3	1.613E+04
85	Sr	38	3.509E+07	5.9	4.058E+03
85	Y	39	4.499E+05	49.7	1.750E+04
85	Zr	40	1.055E+05	99	1.090E+01
86	Rb	37	1.606E+09	0.8	6.102E+01
86	Y	39	3.261E+06	20.6	2.880E+03
87	Sr	38	6.250E+08	1.4	1.009E+04
87	Y	39	3.745E+07	5.2	4.813E+04
87	Zr	40	1.070E+05	99	1.400E+01
89	Y	39	8.231E+08	1.2	1.606E+01
89	Zr	40	2.232E+07	7.1	2.508E+02
89	Nb	41	2.249E+05	70.4	4.248E+03
90	Rb	37	6.451E+09	0.4	2.580E+02
90	Y	39	1.379E+09	0.9	1.148E+04
90	Zr	40	8.938E+07	2.4	8.092E-01

90	Nb	41	1.301E+06	28.3	1.881E+01
91	Y	39	1.614E+10	0.3	2.983E+03
91	Nb	41	1.871E+06	7.3	5.258E+06
92	Nb	41	3.896E+07	3.7	8.770E+05
93	Y	39	8.855E+09	0.3	8.200E-01
93	Nb	41	3.585E+05	1.8	5.087E+08
93	Mo	42	8.885E+06	10.9	2.466E+04
94	Nb	41	9.185E+08	1.2	3.758E+02
94	Tc	43	8.996E+05	34.9	3.120E+03
95	Nb	41	1.996E+09	0.7	3.118E+05
95	Tc	43	3.421E+05	17.7	5.270E+06
96	Y	39	4.581E+09	0.5	9.600E+00
96	Tc	43	2.609E+07	6.8	3.090E+03
97	Y	39	1.770E+09	0.5	1.170E+00
97	Y	39	2.062E+07	0.5	1.420E-01
97	Nb	41	3.061E+10	0.2	5.270E+01
97	Tc	43	8.378E+06	2.7	7.785E+06
98	Rb	37	3.644E+04	4.6	9.600E-02
98	Y	39	2.103E+09	0.6	2.000E+00
98	Nb	41	7.581E+09	0.4	3.078E+03
98	Rh	45	1.121E+05	99	2.100E+02
99	Nb	41	1.417E+10	0.3	1.560E+02
99	Tc	43	3.302E+10	0.2	2.164E+04
99	Rh	45	5.623E+05	44.3	1.692E+04
100	Y	39	4.067E+08	1.1	9.400E-01
100	Nb	41	6.481E+09	0.4	2.990E+00
100	Rh	45	3.590E+06	16.5	2.760E+02
101	Rh	45	2.556E+07	5.4	3.750E+05
102	Y	39	1.504E+07	2.9	3.000E-01
102	Nb	41	4.574E+09	0.5	4.300E+00
102	Tc	43	7.252E+09	0.4	2.610E+02
102	Rh	45	6.688E+05	2.9	9.145E+07
103	Rh	45	8.442E+09	0.2	3.367E+03
103	Ag	47	1.992E+05	70.7	5.700E+00
104	Nb	41	9.460E+08	0.8	9.200E-01
104	Rh	45	1.250E+09	1	2.604E+02
104	Ag	47	4.497E+05	49.9	2.010E+03
105	Rh	45	2.039E+10	0.2	4.000E+01
105	Ag	47	6.625E+06	12.1	4.338E+02
106	Rh	45	5.320E+09	0.5	7.800E+03
106	Ag	47	1.309E+07	6.3	7.309E+05
107	Pd	46	1.923E+09	0.7	2.130E+01
107	Ag	47	1.648E+08	2.6	4.430E+01



108	Rh	45	1.103E+10	0.3	3.600E+02
108	Ag	47	1.631E+04	1.6	1.318E+10
108	In	49	1.124E+05	99	2.376E+03
109	Ru	44	8.036E+09	0.4	1.300E+01
109	Rh	45	8.184E+09	0.3	1.600E-06
109	Pd	46	6.631E+09	0.4	2.818E+02
109	Ag	47	7.233E+10	0.1	3.960E+01
109	In	49	7.434E+05	31	8.040E+01
109	In	49	2.764E+04	31	2.100E-01
110	Rh	45	3.174E+10	0.2	2.850E+01
110	Ag	47	5.995E+07	0.6	2.158E+07
110	In	49	4.161E+06	16.6	4.146E+03
111	Pd	46	1.124E+10	0.3	1.980E+04
111	Ag	47	6.300E+10	0.2	6.480E+01
111	Cd	48	7.705E+08	1.2	2.912E+03
111	In	49	2.864E+07	6.4	4.620E+02
112	Rh	45	6.966E+09	0.4	6.800E+00
112	In	49	1.112E+08	3.3	1.234E+03
113	Pd	46	7.023E+09	0.3	1.000E+02
113	Pd	46	7.016E+08	0.3	3.000E-01
113	Ag	47	1.854E+10	0.2	6.870E+01
113	Cd	48	4.755E+06	0.4	4.447E+08
113	In	49	4.787E+08	1.6	5.970E+03
113	Sn	50	9.667E+06	11.1	1.284E+03
114	Rh	45	2.018E+09	0.6	1.850E+00
114	In	49	7.147E+07	1.1	4.278E+06
115	Pd	46	5.535E+09	0.4	5.000E+01
115	Ag	47	1.700E+10	0.2	1.800E+01
115	Cd	48	1.146E+09	0.3	3.853E+06
115	In	49	4.950E+10	0.1	1.615E+04
116	Rh	45	3.212E+08	1.3	9.000E-01
116	Ag	47	8.604E+09	0.4	8.600E+00
116	In	49	5.190E+09	0.3	3.265E+03
116	In	49	1.888E+09	0.5	2.180E+00
116	Sb	51	1.765E+07	7.4	3.618E+03
117	Ag	47	1.047E+10	0.3	5.340E+00
117	Cd	48	1.996E+10	0.2	1.210E+04
117	In	49	2.854E+10	0.2	6.972E+03
117	Sn	50	4.914E+08	0.8	1.175E+06
118	Ag	47	4.615E+09	0.5	2.000E+00
118	In	49	9.861E+09	0.3	2.670E+02
118	In	49	4.582E+09	0.4	8.500E+00
118	Sb	51	2.392E+08	2.2	1.800E+04

119	Ag	47	3.019E+09	0.6	6.000E+00
119	Cd	48	9.831E+09	0.3	1.320E+02
119	In	49	2.112E+10	0.2	1.080E+03
119	Sn	50	7.938E+07	0.5	2.532E+07
119	Te	52	1.807E+07	6.3	4.061E+05
120	Ag	47	1.629E+08	0.8	3.200E-01
120	In	49	5.375E+09	0.4	4.620E+01
120	In	49	5.377E+09	0.4	4.730E+01
120	Sb	51	8.536E+08	0.9	4.977E+05
120	I	53	1.349E+06	28.3	3.180E+03
121	Cd	48	2.484E+09	0.6	8.300E+00
121	In	49	1.201E+10	0.3	2.328E+02
121	Sn	50	2.225E+06	0.3	1.734E+09
121	Te	52	1.122E+07	1.9	1.331E+07
122	Ag	47	1.644E+08	2.1	1.500E+00
122	In	49	3.183E+09	0.5	1.030E+01
122	In	49	3.193E+09	0.5	1.080E+01
122	Sb	51	3.815E+09	0.6	2.526E+02
123	Cd	48	4.872E+08	1.2	1.820E+00
123	In	49	4.732E+09	0.5	4.780E+01
123	Sn	50	1.641E+10	0.3	2.404E+03
123	Te	52	6.772E+07	0.8	1.034E+07
124	In	49	1.604E+09	0.7	3.400E+00
124	Sb	51	7.044E+09	0.3	9.300E+01
124	Sb	51	3.533E+09	0.4	1.212E+03
125	Cd	48	3.709E+07	2.9	5.700E-01
125	In	49	1.392E+09	0.9	1.220E+01
125	Sn	50	4.989E+09	0.5	5.712E+02
125	Te	52	3.046E+08	0.6	4.959E+06
125	Xe	54	6.056E+07	4.2	5.700E+01
126	In	49	4.526E+08	1.5	1.640E+00
126	Sb	51	6.130E+09	0.4	1.149E+03
126	Sb	51	2.879E+09	0.5	1.100E+01
127	In	49	2.797E+08	1.8	3.760E+00
127	Sn	50	1.689E+09	0.8	2.478E+02
127	Te	52	2.589E+08	0.5	9.418E+06
127	Xe	54	4.299E+08	1.6	6.920E+01
128	In	49	4.103E+07	3.1	7.000E-01
128	Sn	50	8.477E+08	1.2	6.500E+00
128	Sb	51	4.723E+09	0.5	6.240E+02
129	In	49	3.141E+07	4.4	1.230E+00
129	Sn	50	3.451E+08	1.7	4.140E+02
129	Sb	51	2.462E+09	0.6	1.062E+03

129	Te	52	6.448E+08	0.5	2.903E+06
129	Xe	54	6.346E+08	0.9	7.681E+05
129	Ba	56	8.322E+06	11.3	7.812E+03
129	La	57	6.524E+04	70.7	5.600E-01
130	In	49	4.481E+06	8	5.400E-01
130	In	49	4.709E+06	7.6	5.400E-01
130	Sn	50	2.985E+08	1.8	1.020E+02
130	Sb	51	1.455E+09	0.8	3.780E+02
130	I	53	3.595E+09	0.6	5.400E+02
130	Cs	55	4.423E+08	1.6	2.076E+02
131	In	49	1.378E+06	9.1	3.500E-01
131	In	49	5.261E+05	10.7	3.200E-01
131	Sn	50	1.338E+08	2.6	3.900E+01
131	Te	52	2.652E+09	0.6	1.080E+05
131	Xe	54	9.380E+08	0.7	1.028E+06
131	Ba	56	1.032E+08	3.5	8.760E+02
132	Sb	51	6.064E+08	1.4	2.460E+02
132	I	53	3.772E+09	0.5	4.993E+03
132	La	57	1.372E+07	8.9	1.458E+03
133	Te	52	1.376E+09	0.9	3.324E+03
133	I	53	4.200E+09	0.5	9.000E+00
133	Xe	54	3.625E+09	0.5	1.892E+05
133	Ba	56	4.408E+08	1.6	1.400E+05
133	Ce	58	3.374E+05	57.5	1.764E+04
134	Sb	51	1.489E+08	2.3	1.043E+01
134	I	53	2.952E+09	0.6	2.214E+02
134	Xe	54	5.526E+08	0.4	2.900E-01
134	Cs	55	2.394E+09	0.7	1.048E+04
135	Xe	54	4.998E+09	0.4	9.174E+02
135	Cs	55	4.151E+09	0.5	3.180E+03
135	Ba	56	1.158E+09	1	1.033E+05
135	Ce	58	1.923E+07	8	2.000E+01
136	I	53	8.776E+08	1	4.690E+01
136	Cs	55	4.106E+09	0.5	1.900E+01
136	Ba	56	4.942E+08	0.4	3.084E-01
136	La	57	9.528E+05	1.6	1.140E-01
137	Ba	56	2.767E+09	0.7	1.531E+02
137	Ce	58	1.201E+08	2.9	1.238E+05
137	Nd	60	7.293E+04	99	1.600E+00
138	Cs	55	3.050E+09	0.7	1.746E+02
138	Pr	59	2.305E+07	7.6	7.632E+03
139	Ce	58	4.299E+08	1.6	5.480E+01
139	Nd	60	1.912E+06	24.9	1.980E+04

140	Pm	61	3.368E+05	57.6	3.570E+02
141	Nd	60	2.480E+07	6.5	6.200E+01
142	Pr	59	3.040E+08	1.9	8.760E+02
143	Sm	62	3.710E+05	44.3	6.600E+01
144	Cs	55	1.124E+08	2	1.000E+00
144	Pr	59	7.145E+08	1.2	4.320E+02
146	La	57	8.978E+08	1.1	1.000E+01
148	Pr	59	1.181E+09	1	1.200E+02
148	Pm	61	1.733E+07	3	3.567E+06
150	Eu	63	8.323E+06	12.3	4.608E+04
152	Pm	61	2.406E+08	1.7	4.512E+02
152	Pm	61	2.409E+08	1.7	8.280E+02
152	Eu	63	1.635E+07	7.4	3.339E+04
152	Eu	63	1.634E+07	7.4	5.760E+03
152	Tb	65	1.122E+05	99	2.520E+02
154	Pm	61	2.770E+08	1.9	1.608E+02
154	Eu	63	4.014E+07	4.9	2.778E+03
154	Tb	65	1.350E+06	26.5	3.384E+04
154	Tb	65	1.346E+06	26.5	8.172E+04
156	Tb	65	2.613E+06	16.2	8.784E+04
156	Tb	65	2.624E+06	16.2	1.908E+04
158	Tb	65	7.475E+06	11.5	1.050E+01
158	Ho	67	7.495E+04	99	1.620E+03
158	Ho	67	7.494E+04	99	1.278E+03
159	Ho	67	4.138E+05	49.8	8.300E+00
160	Ho	67	8.997E+05	28.2	1.807E+04
160	Ho	67	7.142E+05	28.2	3.000E+00
161	Ho	67	2.233E+06	20.4	6.760E+00
162	Ho	67	2.811E+06	19	4.020E+03
163	Ho	67	1.251E+06	22	1.090E+00
164	Ho	67	3.261E+06	18.8	2.250E+03
164	Tm	69	3.367E+05	57.5	3.060E+02
165	Dy	66	5.206E+06	18.1	7.542E+01
167	Er	68	1.289E+06	23.1	2.269E+00
169	Yb	70	4.432E+05	49.9	4.600E+01
169	Lu	71	1.120E+05	99	1.600E+02
170	Ho	67	2.213E+05	70.7	4.300E+01
170	Lu	71	3.997E+04	99	6.700E-01
171	Lu	71	2.230E+05	70.5	7.900E+01
172	Lu	71	3.364E+05	57.5	2.220E+02
174	Lu	71	1.723E+04	49.6	1.227E+07
176	Lu	71	1.125E+05	99	1.309E+04
177	Yb	70	1.009E+05	99	6.410E+00

177	Hf	72	3.947E+04	98.9	1.080E+00
177	Hf	72	7.496E+04	98.9	3.084E+03
178	Lu	71	1.124E+05	99	1.386E+03
178	Hf	72	6.305E+04	99	4.000E+00
178	Ta	73	1.125E+05	99	8.496E+03
179	W	74	1.123E+05	99	3.840E+02
180	Hf	72	1.125E+05	99	1.980E+04
182	Re	75	1.125E+05	99	4.572E+04
183	W	74	1.969E+05	70.5	5.200E+00
184	Re	75	7.261E+03	71	1.460E+07
189	Au	79	1.122E+05	99	2.754E+02
190	Os	76	1.123E+05	99	5.940E+02
190	Ir	77	7.497E+04	99	4.032E+03
190	Ir	77	7.498E+04	99	1.170E+04
191	Au	79	5.295E+04	99	9.200E-01
191	Hg	80	1.124E+05	99	3.048E+03
193	Au	79	1.318E+06	26	3.900E+00
193	Hg	80	2.024E+06	24	4.248E+04
193	Tl	81	1.119E+06	31.1	1.266E+02
194	Tl	81	2.249E+06	21.5	1.968E+03
195	Pt	78	1.683E+05	70.6	3.473E+05
195	Au	79	9.895E+05	32.8	3.050E+01
195	Hg	80	4.963E+06	14.4	1.498E+05
195	Tl	81	3.618E+06	15.2	3.600E+00
195	Pb	82	2.248E+05	70.7	9.000E+02
196	Au	79	4.818E+05	37.4	8.100E+00
196	Au	79	5.249E+05	37.4	3.492E+04
196	Tl	81	3.824E+06	17	5.076E+03
197	Pt	78	2.249E+05	70.5	5.725E+03
197	Au	79	3.085E+05	57.7	7.730E+00
197	Hg	80	2.241E+06	22.6	8.568E+04
197	Tl	81	1.776E+06	14.1	5.400E-01
197	Pb	82	3.711E+06	16.2	2.580E+03
197	Bi	83	7.856E+05	37.4	3.120E+02
198	Au	79	2.048E+05	70.5	1.987E+05
198	Tl	81	2.924E+06	15.6	6.732E+03
198	Bi	83	9.251E+05	32.8	7.700E+00
199	Pt	78	1.069E+05	99	1.360E+01
199	Hg	80	8.995E+05	39	2.556E+03
199	Pb	82	5.506E+06	13.5	7.320E+02
199	Bi	83	4.834E+06	14.7	1.482E+03
199	Po	84	2.243E+05	71	2.520E+02
200	Bi	83	3.298E+06	15.5	1.860E+03

200	Bi	83	5.832E+05	15.5	4.000E-01
201	Pb	82	3.002E+06	19	6.100E+01
201	Bi	83	6.185E+06	13.3	3.546E+03
201	Po	84	3.482E+06	19.2	5.340E+02
202	Pb	82	2.924E+06	19.4	1.271E+04
202	At	85	7.794E+05	32.2	1.500E+00
203	Pb	82	1.209E+06	22.8	6.300E+00
203	Pb	82	3.185E+05	22.8	4.800E-01
203	Bi	83	6.051E+05	12.8	3.030E-01
203	Po	84	8.306E+06	11.9	4.500E+01
204	Pb	82	4.498E+05	49.7	4.032E+03
204	At	85	1.340E+04	11.6	1.080E-01
206	Tl	81	8.970E+05	39.1	2.244E+02
207	Pb	82	3.011E+06	0.4	8.060E-01
207	Po	84	8.159E+06	10.3	2.790E+00
211	Po	84	7.659E+05	37.4	2.520E+01
212	Po	84	7.384E+04	99	4.510E+01
212	Po	84	7.384E+04	99	4.510E+01
212	At	85	3.654E+04	9	1.190E-01
222	Ac	89	6.357E+09	0.4	6.300E+01

Inconel 625 housing					
A	Sym.	Z	Bq	Err. (%)	T 1/2 (s)
3	H	1	3.670E+08	0.1	3.888E+08
6	He	2	1.753E+09	0.7	8.067E-01
7	Be	4	1.337E+09	0.4	4.604E+06
8	He	2	2.192E+04	18.9	1.190E-01
8	Li	3	6.247E+08	1.2	8.380E-01
8	Be	4	7.964E+08	1.1	6.709E-17
8	B	5	1.708E+08	2.2	7.700E-01
9	Li	3	1.687E+06	5.2	1.783E-01
9	B	5	1.211E+05	8.9	8.449E-19
9	C	6	1.211E+05	8.9	1.265E-01
10	C	6	5.327E+08	1.8	1.925E+01
11	Be	4	5.314E+07	7	1.381E+01
11	C	6	6.170E+09	0.6	1.223E+03
13	N	7	1.142E+09	1.4	5.979E+02
14	C	6	4.387E+03	1.1	1.807E+11
14	O	8	1.071E+08	4.8	7.061E+01
15	C	6	8.678E+07	4.4	2.449E+00

15	O	8	1.112E+09	1.3	1.222E+02
16	C	6	2.401E+06	18.2	7.470E-01
16	N	7	4.416E+08	2.1	7.130E+00
17	N	7	1.160E+08	4.1	4.173E+00
17	F	9	3.409E+08	2.6	6.449E+01
18	N	7	3.037E+06	15.9	6.240E-01
18	F	9	1.035E+09	1.4	6.586E+03
18	Ne	10	2.705E+07	6.7	1.672E+00
19	O	8	9.799E+07	5.3	2.691E+01
19	Ne	10	2.233E+08	3.3	1.734E+01
20	O	8	1.581E+07	11.5	1.351E+01
20	F	9	3.398E+08	2.3	1.100E+01
20	Na	11	3.553E+06	10.9	4.479E-01
21	O	8	1.469E+06	34.8	3.420E+00
21	F	9	5.375E+07	6.4	4.158E+00
21	Na	11	1.726E+08	3.5	2.249E+01
22	F	9	7.447E+06	16.1	4.230E+00
22	Na	11	8.151E+06	1.3	8.205E+07
22	Mg	12	1.973E+07	10.1	3.857E+00
23	F	9	1.648E+05	99	2.230E+00
23	Ne	10	6.425E+07	5.8	3.724E+01
23	Mg	12	2.903E+08	2.8	1.132E+01
23	Al	13	5.147E+04	99	4.700E-01
24	Ne	10	1.457E+07	12.3	2.028E+02
24	Na	11	6.739E+08	1.4	5.385E+04
24	Al	13	7.518E+06	11.2	2.053E+00
25	Na	11	1.005E+08	5	5.910E+01
25	Al	13	3.466E+08	2.4	7.183E+00
25	Si	14	1.927E+04	70.1	2.200E-01
26	Na	11	4.006E+06	17.5	1.072E+00
26	Si	14	5.542E+07	5.2	2.234E+00
27	Na	11	8.996E+04	49.8	3.010E-01
27	Mg	12	2.127E+08	3.3	5.675E+02
27	Si	14	1.399E+09	1.3	4.160E+00
27	P	15	1.564E+04	99	2.600E-01
28	Mg	12	1.774E+07	10.9	7.528E+04
28	Al	13	1.399E+09	1.3	1.345E+02
28	P	15	2.684E+06	7.7	2.703E-01
29	Mg	12	2.640E+05	70.4	1.300E+00
29	Al	13	4.180E+08	2.4	3.936E+02
29	P	15	5.537E+07	6.3	4.142E+00
30	Al	13	3.340E+07	7.2	3.600E+00
30	P	15	1.846E+09	1.1	1.499E+02

30	S	16	2.498E+05	71	1.178E+00
31	Al	13	1.840E+06	21.2	6.440E-01
31	Si	14	8.148E+08	1.8	9.438E+03
31	S	16	7.027E+07	5.1	2.572E+00
32	Si	14	1.554E+04	3.9	5.424E+09
32	P	15	1.457E+09	0.7	1.232E+06
32	Cl	17	1.099E+05	44.3	2.980E-01
33	Si	14	9.451E+06	14.5	6.180E+00
33	P	15	4.529E+08	1	2.189E+06
33	Cl	17	4.216E+07	6.3	2.511E+00
34	Si	14	1.226E+06	37.4	2.770E+00
34	P	15	3.371E+08	2.5	1.243E+01
34	Cl	17	1.319E+09	0.6	1.526E+00
34	Ar	18	9.900E+05	31	8.445E-01
35	P	15	6.872E+07	5.9	4.730E+01
35	S	16	2.127E+08	0.9	7.561E+06
35	Ar	18	1.049E+08	3.8	1.775E+00
36	P	15	1.391E+06	37.4	5.600E+00
36	K	19	2.964E+05	31	3.420E-01
37	P	15	3.333E+05	70.7	2.310E+00
37	S	16	4.803E+07	7.1	3.030E+02
37	Ar	18	2.056E+09	0.4	3.027E+06
37	K	19	3.949E+07	5.5	1.226E+00
38	S	16	1.260E+07	13.6	1.022E+04
38	Cl	17	1.430E+09	0.9	2.234E+03
38	K	19	9.049E+08	1.1	4.582E+02
38	Ca	20	8.844E+05	25.6	4.400E-01
39	S	16	4.236E+05	70.3	1.150E+01
39	Cl	17	3.369E+08	2.7	3.336E+03
39	Ar	18	7.299E+05	0.4	8.483E+09
39	Ca	20	1.456E+08	2.8	8.596E-01
40	Cl	17	2.565E+07	8.8	8.100E+01
40	Sc	21	5.021E+04	34.1	1.823E-01
41	Cl	17	4.418E+06	22.7	3.840E+01
41	Ar	18	5.459E+08	2.1	6.560E+03
41	Ca	20	6.165E+03	0.2	3.248E+12
41	Sc	21	2.589E+07	5.4	5.963E-01
42	Cl	17	2.031E+05	99	6.800E+00
42	Ar	18	5.161E+04	4.4	1.038E+09
42	K	19	7.206E+09	0.6	4.450E+04
42	Sc	21	1.137E+09	0.6	6.813E-01
42	Ti	22	2.072E+04	57.7	1.990E-01
43	Ar	18	7.183E+06	17.1	3.222E+02



43	K	19	2.206E+09	1	8.028E+04
43	Sc	21	2.611E+10	0.3	1.401E+04
43	Ti	22	3.441E+07	4	5.090E-01
44	Ar	18	4.494E+05	70.5	7.122E+02
44	K	19	3.341E+08	2.6	1.328E+03
44	Sc	21	8.361E+10	0.1	1.414E+04
44	Ti	22	7.171E+06	0.3	1.545E+09
45	K	19	4.001E+07	7.5	1.038E+03
45	Ca	20	2.031E+08	0.6	1.415E+07
45	Ti	22	7.381E+10	0.2	1.109E+04
45	V	23	2.559E+07	4.9	5.470E-01
46	K	19	5.587E+06	21.5	1.050E+02
46	Sc	21	2.844E+09	0.2	7.239E+06
46	V	23	2.044E+09	0.3	4.224E-01
46	Cr	24	2.659E+05	23.4	2.600E-01
47	K	19	4.324E+05	70.5	1.750E+01
47	Ca	20	4.475E+07	5.8	3.919E+05
47	Sc	21	1.241E+10	0.4	2.890E+05
47	V	23	6.632E+10	0.2	1.956E+03
47	Cr	24	7.173E+07	2.8	5.080E-01
48	Sc	21	3.004E+09	0.8	1.572E+05
48	V	23	8.345E+10	0.1	1.380E+06
48	Cr	24	1.543E+10	0.4	7.762E+04
48	Mn	25	8.697E+04	17.5	1.581E-01
49	Sc	21	3.023E+08	2.8	3.432E+03
49	V	23	7.074E+09	0.1	2.920E+07
49	Cr	24	1.397E+11	0.1	2.538E+03
49	Mn	25	3.463E+07	3.3	3.840E-01
50	Sc	21	9.501E+06	11.1	1.025E+02
50	Mn	25	6.617E+08	0.4	2.831E-01
50	Fe	26	7.528E+04	17.5	1.500E-01
51	Sc	21	2.127E+05	99	1.240E+01
51	Ti	22	3.940E+08	2.7	3.456E+02
51	Cr	24	1.069E+11	0.1	2.393E+06
51	Mn	25	1.028E+11	0.2	2.772E+03
51	Fe	26	5.359E+07	2.1	3.050E-01
52	Ti	22	3.731E+07	8	1.020E+02
52	V	23	1.078E+10	0.5	2.250E+02
52	Mn	25	1.058E+11	0.1	4.831E+05
52	Fe	26	1.488E+10	0.3	2.979E+04
53	V	23	1.922E+09	1.1	9.660E+01
53	Fe	26	1.260E+11	0.1	5.106E+02
53	Co	27	8.376E+06	2.9	2.400E-01

54	V	23	1.771E+07	10.4	4.980E+01
54	Mn	25	2.980E+09	0.1	2.697E+07
54	Co	27	2.787E+08	0.3	1.932E-01
54	Ni	28	1.417E+05	10.8	1.400E-01
55	V	23	4.046E+05	70.6	6.540E+00
55	Cr	24	1.338E+08	4.2	2.098E+02
55	Fe	26	3.445E+09	0.1	8.609E+07
55	Co	27	1.370E+11	0.1	6.311E+04
55	Ni	28	4.193E+07	1.5	2.121E-01
56	Cr	24	2.582E+07	9.8	3.564E+02
56	Mn	25	4.733E+09	0.7	9.283E+03
56	Co	27	3.393E+10	0.1	6.676E+06
56	Ni	28	3.224E+10	0.2	5.098E+05
57	Cr	24	1.741E+06	34.9	2.110E+01
57	Mn	25	9.803E+08	1.5	8.540E+01
57	Co	27	1.473E+10	0.1	2.348E+07
57	Ni	28	3.353E+11	0.1	1.282E+05
57	Cu	29	1.439E+07	2.1	1.994E-01
58	Cr	24	6.112E+05	57.5	7.000E+00
58	Mn	25	2.361E+07	6.5	3.000E+00
58	Co	27	1.294E+10	0.1	6.119E+06
58	Cu	29	9.824E+09	0.4	3.204E+00
59	Mn	25	1.161E+07	12.7	4.600E+00
59	Fe	26	1.167E+08	1.5	3.845E+06
59	Ni	28	4.017E+04	0.1	2.397E+12
59	Cu	29	2.168E+09	1	8.150E+01
59	Zn	30	4.990E+03	99	1.820E-01
60	Cr	24	1.333E+05	70.5	5.700E-01
60	Mn	25	3.631E+05	44.9	2.800E-01
60	Co	27	3.415E+07	0.3	1.662E+08
60	Cu	29	8.126E+09	0.5	1.422E+03
60	Zn	30	8.954E+05	49.7	1.428E+02
61	Mn	25	2.542E+05	57.3	7.100E-01
61	Fe	26	6.616E+07	5.7	3.588E+02
61	Co	27	9.935E+09	0.5	5.940E+03
61	Cu	29	3.258E+09	0.8	1.200E+04
61	Zn	30	8.035E+06	17.8	8.910E+01
62	Mn	25	4.093E+05	49.6	8.800E-01
62	Fe	26	4.476E+07	7	6.800E+01
62	Co	27	5.621E+08	1.4	9.000E+01
62	Cu	29	3.032E+09	0.9	5.844E+02
62	Zn	30	4.476E+07	6.5	3.307E+04
63	Fe	26	8.031E+05	49.7	6.100E+00

63	Co	27	1.647E+09	1.2	2.740E+01
63	Ni	28	1.115E+06	0.6	3.157E+09
63	Zn	30	7.893E+07	5.2	2.308E+03
64	Fe	26	3.181E+05	70.4	2.000E+00
64	Co	27	1.074E+06	26.6	3.000E-01
64	Cu	29	6.544E+08	1.8	4.572E+04
64	Ga	31	8.958E+05	49.7	1.578E+02
65	Fe	26	1.193E+05	57.4	4.000E-01
65	Co	27	2.150E+06	24.7	1.200E+00
65	Ni	28	2.302E+07	5.9	9.062E+03
65	Zn	30	1.171E+06	7	2.110E+07
65	Ga	31	6.743E+06	17.8	9.120E+02
66	Co	27	1.547E+05	26.3	2.300E-01
66	Ni	28	7.185E+06	16.4	1.966E+05
66	Cu	29	1.271E+07	12	3.053E+02
66	Ga	31	2.654E+07	9.2	3.416E+04
66	Ge	32	1.125E+06	44.3	8.136E+03
67	Co	27	2.591E+05	40.4	4.200E-01
67	Ni	28	4.157E+06	22.4	2.100E+01
67	Cu	29	7.952E+06	15.3	2.226E+05
67	Ga	31	5.938E+07	5.8	2.818E+05
67	Ge	32	9.667E+06	15.4	1.134E+03
68	Co	27	7.929E+04	29.5	1.800E-01
68	Ni	28	9.356E+06	15.3	1.900E+01
68	Cu	29	1.437E+07	11.4	3.110E+01
68	Ga	31	8.951E+07	5	4.058E+03
68	Ge	32	1.814E+06	4.7	2.340E+07
68	As	33	1.344E+06	40.4	1.516E+02
69	Co	27	2.072E+05	28.5	2.700E-01
69	Ni	28	6.830E+06	17.2	1.140E+01
69	Cu	29	1.325E+07	12.9	1.710E+02
69	Zn	30	1.642E+07	11	3.384E+03
69	Ge	32	1.383E+08	4.2	1.406E+05
69	As	33	7.642E+06	17.5	9.120E+02
70	Cu	29	8.859E+06	14.1	4.450E+01
70	Ga	31	2.361E+07	10.2	1.268E+03
70	As	33	5.015E+07	6.9	3.156E+03
70	Se	34	4.947E+06	22.3	2.466E+03
71	Ni	28	3.719E+06	19.7	1.860E+00
71	Cu	29	1.883E+07	11	1.950E+01
71	Zn	30	2.483E+07	9.1	1.470E+02
71	Ge	32	8.974E+07	2.2	9.876E+05
71	As	33	1.886E+08	3.1	2.350E+05

71	Se	34	1.683E+07	11.1	2.844E+02
71	Br	35	2.178E+05	99	2.140E+01
72	Ni	28	2.731E+06	23.6	2.060E+00
72	Cu	29	1.207E+07	13.6	6.600E+00
72	Zn	30	3.542E+07	7.4	1.674E+05
72	Ga	31	4.239E+07	6.8	5.076E+04
72	As	33	3.166E+08	2.4	9.360E+04
72	Se	34	1.163E+08	3.3	7.258E+05
72	Br	35	1.677E+06	23.1	7.860E+01
73	Ni	28	1.250E+06	28.2	9.000E-01
73	Cu	29	1.386E+07	12.4	3.900E+00
73	Zn	30	3.005E+07	7.6	2.350E+01
73	Ga	31	5.151E+07	6.3	1.750E+04
73	As	33	4.155E+07	1.7	6.938E+06
73	Se	34	3.104E+08	2	2.574E+04
73	Br	35	2.062E+07	11	2.040E+02
74	Ni	28	9.583E+05	35	1.100E+00
74	Cu	29	6.139E+06	15.8	1.594E+00
74	Zn	30	3.668E+07	7.7	9.600E+01
74	Ga	31	4.685E+07	5.1	4.872E+02
74	As	33	2.912E+07	4.7	1.535E+06
74	Br	35	7.870E+07	3.7	1.524E+03
74	Kr	36	3.820E+06	23.4	6.900E+02
75	Cu	29	3.695E+06	18	1.300E+00
75	Zn	30	2.116E+07	9.6	1.020E+01
75	Ga	31	5.878E+07	6	1.260E+02
75	Ge	32	7.271E+07	5.1	4.967E+03
75	Se	34	7.465E+07	1.1	1.035E+07
75	Br	35	7.206E+08	1.7	5.802E+03
75	Kr	36	4.218E+07	7	2.580E+02
75	Rb	37	2.169E+05	99	1.900E+01
76	Cu	29	4.332E+05	40.3	6.100E-01
76	Zn	30	1.957E+07	11.1	5.700E+00
76	Ga	31	5.536E+07	6.5	2.910E+01
76	As	33	1.565E+07	11.8	9.475E+04
76	Br	35	1.876E+09	0.8	5.832E+04
76	Kr	36	6.289E+08	1.8	5.328E+04
76	Rb	37	9.282E+06	15.7	3.910E+01
77	Cu	29	3.592E+05	37.4	4.690E-01
77	Zn	30	8.234E+06	10.7	2.080E+00
77	Ga	31	5.480E+07	5.6	1.320E+01
77	Ge	32	3.822E+07	4.5	4.068E+04
77	As	33	1.318E+08	3.6	1.398E+05

77	Br	35	2.776E+09	0.8	2.053E+05
77	Kr	36	1.650E+09	1.2	4.464E+03
77	Rb	37	5.988E+07	5.9	2.250E+02
77	Sr	38	2.083E+05	99	9.000E+00
78	Cu	29	2.964E+04	99	3.420E-01
78	Zn	30	5.175E+06	16.7	1.470E+00
78	Ga	31	3.218E+07	8.1	5.090E+00
78	Ge	32	1.133E+08	4.5	5.280E+03
78	As	33	1.500E+08	3.9	5.442E+03
78	Br	35	7.257E+08	1.7	3.876E+02
78	Rb	37	2.598E+08	1.9	1.060E+03
78	Sr	38	1.030E+07	14	1.500E+02
79	Cu	29	5.634E+03	99	1.880E-01
79	Zn	30	1.070E+06	34.8	9.950E-01
79	Ga	31	2.614E+07	8.8	2.847E+00
79	Ge	32	5.790E+07	5.4	1.898E+01
79	As	33	1.598E+08	3.4	5.406E+02
79	Kr	36	6.142E+09	0.5	1.261E+05
79	Rb	37	2.397E+09	0.9	1.374E+03
79	Sr	38	1.374E+08	3.8	1.350E+02
79	Y	39	4.293E+05	70.7	1.480E+01
80	Zn	30	5.044E+05	34.8	5.450E-01
80	Ga	31	9.133E+06	13.6	1.697E+00
80	Ge	32	8.541E+07	5	2.950E+01
80	As	33	1.529E+08	3.8	1.520E+01
80	Br	35	1.237E+08	3.2	1.061E+03
80	Rb	37	6.248E+09	0.6	3.400E+01
80	Sr	38	1.591E+09	1.1	6.378E+03
80	Y	39	1.191E+07	13.9	3.500E+01
81	Ga	31	5.610E+06	15.5	1.221E+00
81	Ge	32	2.040E+07	7.1	7.600E+00
81	As	33	1.520E+08	3.5	3.330E+01
81	Se	34	2.159E+08	2.8	1.107E+03
81	Rb	37	1.221E+10	0.3	1.647E+04
81	Sr	38	3.945E+09	0.7	1.338E+03
81	Y	39	1.591E+08	3.6	7.240E+01
81	Zr	40	1.933E+06	32.8	1.500E+01
82	Ga	31	7.113E+05	31.1	6.020E-01
82	Ge	32	3.194E+07	7.9	4.600E+00
82	As	33	7.350E+07	4.7	1.910E+01
82	Br	35	4.842E+07	4.8	1.271E+05
82	Rb	37	5.722E+09	0.4	7.638E+01
82	Sr	38	3.332E+09	0.3	2.208E+06

82	Y	39	9.679E+08	1.5	9.500E+00
82	Zr	40	2.157E+07	10	3.200E+01
83	Ga	31	9.618E+04	49.9	3.100E-01
83	Ge	32	8.138E+06	13.4	1.850E+00
83	As	33	9.987E+07	4.8	1.340E+01
83	Se	34	7.796E+07	3.5	1.338E+03
83	Br	35	2.891E+08	2.6	8.640E+03
83	Rb	37	1.225E+09	0.2	7.448E+06
83	Sr	38	2.120E+10	0.2	1.167E+05
83	Y	39	3.410E+09	0.5	4.248E+02
83	Zr	40	2.201E+08	3	4.400E+01
83	Nb	41	5.699E+05	57.4	4.100E+00
84	Ge	32	5.384E+06	15.4	1.200E+00
84	As	33	2.771E+07	6.8	5.500E+00
84	Se	34	2.172E+08	3	1.860E+02
84	Br	35	2.699E+08	2.6	1.908E+03
84	Rb	37	1.696E+08	1	2.831E+06
84	Y	39	7.463E+09	0.4	4.600E+00
84	Zr	40	1.973E+09	1	1.554E+03
84	Nb	41	1.168E+07	13.5	1.200E+01
85	Ge	32	8.170E+05	28.2	5.800E-01
85	As	33	2.153E+07	8.5	2.028E+00
85	Se	34	9.675E+07	4.4	3.170E+01
85	Br	35	2.855E+08	2.7	1.740E+02
85	Kr	36	1.516E+05	2.6	3.392E+08
85	Sr	38	3.314E+09	0.2	5.602E+06
85	Y	39	1.950E+10	0.3	9.648E+03
85	Zr	40	5.073E+09	0.5	4.716E+02
85	Nb	41	2.261E+08	3.2	2.090E+01
86	As	33	5.832E+06	14.3	9.000E-01
86	Se	34	8.721E+07	4.7	1.530E+01
86	Br	35	2.021E+08	3.5	5.510E+01
86	Rb	37	4.175E+07	2.5	1.610E+06
86	Y	39	5.297E+10	0.2	5.306E+04
86	Zr	40	2.783E+10	0.3	5.940E+04
86	Nb	41	1.445E+09	1.3	8.800E+01
86	Mo	42	1.194E+07	12.7	1.960E+01
87	As	33	2.263E+06	19.4	7.300E-01
87	Se	34	2.832E+07	7.9	5.850E+00
87	Br	35	1.475E+08	3.8	5.560E+01
87	Kr	36	2.721E+08	2.7	4.578E+03
87	Y	39	5.303E+10	0.1	2.873E+05
87	Zr	40	4.365E+10	0.2	6.048E+03

87	Nb	41	2.792E+09	0.6	2.220E+02
87	Mo	42	1.373E+08	4.1	1.340E+01
88	Se	34	1.212E+07	11	1.520E+00
88	Br	35	9.105E+07	4.8	1.650E+01
88	Kr	36	2.521E+08	2.9	1.022E+04
88	Rb	37	3.682E+08	2.4	1.067E+03
88	Y	39	7.129E+08	0.4	9.215E+06
88	Zr	40	4.928E+09	0.2	7.206E+06
88	Nb	41	8.796E+09	0.4	8.700E+02
88	Mo	42	8.140E+08	1.7	4.800E+02
88	Tc	43	1.312E+06	31.1	6.400E+00
89	Se	34	1.659E+06	15.6	4.100E-01
89	Br	35	5.266E+07	6.2	4.400E+00
89	Kr	36	1.860E+08	3.3	1.890E+02
89	Rb	37	3.415E+08	2.6	9.090E+02
89	Sr	38	4.895E+07	2.2	4.366E+06
89	Zr	40	6.849E+10	0.1	2.823E+05
89	Nb	41	2.184E+10	0.2	6.840E+03
89	Mo	42	3.647E+09	0.5	1.224E+02
89	Tc	43	8.737E+06	11.1	1.280E+01
90	Br	35	1.982E+07	9	1.920E+00
90	Kr	36	1.195E+08	4.2	3.232E+01
90	Rb	37	1.752E+08	3	1.580E+02
90	Sr	38	2.113E+05	2.1	9.076E+08
90	Y	39	9.328E+08	1.1	2.308E+05
90	Nb	41	6.907E+10	0.1	5.256E+04
90	Mo	42	1.665E+10	0.4	2.041E+04
90	Tc	43	6.917E+07	3.9	8.700E+00
91	Se	34	1.726E+05	31	2.700E-01
91	Br	35	4.347E+06	12	5.410E-01
91	Kr	36	6.285E+07	5.8	8.570E+00
91	Rb	37	2.131E+08	3.2	5.840E+01
91	Sr	38	3.509E+08	2.5	3.467E+04
91	Y	39	7.015E+07	1.4	5.055E+06
91	Nb	41	1.675E+06	0.1	2.144E+10
91	Mo	42	2.641E+10	0.2	9.294E+02
91	Tc	43	3.106E+08	1.8	1.884E+02
92	Br	35	5.367E+05	23.1	3.430E-01
92	Kr	36	2.510E+07	8.4	1.840E+00
92	Rb	37	1.171E+08	4.3	4.510E+00
92	Sr	38	3.076E+08	2.7	9.756E+03
92	Y	39	4.891E+08	2	1.274E+04
92	Tc	43	2.167E+09	1	2.538E+02

93	Kr	36	5.973E+06	13.9	1.286E+00
93	Rb	37	7.796E+07	5	5.840E+00
93	Sr	38	2.145E+08	3.2	4.454E+02
93	Y	39	4.203E+08	2	3.665E+04
93	Mo	42	1.721E+05	0.2	1.261E+11
93	Tc	43	6.619E+09	0.4	9.900E+03
94	Kr	36	1.990E+05	18.8	2.000E-01
94	Rb	37	3.190E+07	7.4	2.702E+00
94	Sr	38	1.592E+08	3.6	7.530E+01
94	Y	39	3.308E+08	2.5	1.122E+03
94	Nb	41	8.254E+03	0.3	6.402E+11
94	Tc	43	4.030E+09	0.5	1.758E+04
94	Ru	44	8.996E+05	49.8	3.108E+03
95	Kr	36	3.700E+05	49.6	7.800E-01
95	Rb	37	3.587E+06	12	3.770E-01
95	Sr	38	8.005E+07	4.9	2.390E+01
95	Y	39	2.570E+08	3	6.180E+02
95	Zr	40	5.642E+07	1.9	5.531E+06
95	Nb	41	9.457E+08	0.4	3.022E+06
95	Tc	43	4.170E+09	0.5	7.200E+04
95	Ru	44	4.049E+06	22.8	5.915E+03
96	Rb	37	1.991E+05	18.5	2.028E-01
96	Sr	38	3.210E+07	6.2	1.070E+00
96	Y	39	1.126E+08	3.9	5.340E+00
96	Nb	41	4.665E+09	0.7	8.406E+04
96	Tc	43	3.981E+09	0.4	3.698E+05
97	Rb	37	9.511E+04	20.7	1.699E-01
97	Sr	38	4.339E+06	11.3	4.290E-01
97	Y	39	6.899E+07	3.6	3.750E+00
97	Zr	40	3.340E+08	2.3	6.084E+04
97	Nb	41	5.267E+09	0.5	4.326E+03
97	Ru	44	4.601E+06	20.3	2.506E+05
98	Sr	38	4.535E+06	12.9	6.530E-01
98	Y	39	1.755E+07	5.2	5.480E-01
98	Zr	40	2.621E+08	2.9	3.070E+01
98	Nb	41	6.059E+08	1.6	2.860E+00
99	Sr	38	2.817E+05	24.2	2.710E-01
99	Y	39	2.585E+07	7.4	1.470E+00
99	Zr	40	1.125E+08	4.1	2.100E+00
99	Nb	41	8.436E+08	1.2	1.500E+01
99	Mo	42	4.533E+09	0.6	2.374E+05
100	Sr	38	1.037E+05	26.1	2.020E-01
100	Y	39	5.902E+06	10.1	7.350E-01



100	Zr	40	1.184E+08	4.1	7.100E+00
100	Nb	41	1.925E+08	3	1.500E+00
100	Tc	43	1.985E+08	3.3	1.580E+01
101	Sr	38	3.162E+03	44.5	1.180E-01
101	Y	39	2.388E+06	14.5	4.480E-01
101	Zr	40	4.874E+07	5.6	2.100E+00
101	Nb	41	2.546E+08	2.8	7.100E+00
101	Mo	42	5.579E+08	1.8	8.766E+02
101	Tc	43	6.921E+08	1.7	8.532E+02
102	Y	39	5.867E+05	20.3	3.600E-01
102	Zr	40	3.385E+07	7	2.900E+00
102	Nb	41	8.095E+07	4	1.300E+00
102	Mo	42	4.925E+08	1.9	6.780E+02
102	Tc	43	5.720E+08	1.7	5.280E+00
102	Rh	45	2.973E+04	31.1	1.788E+07
103	Zr	40	9.107E+06	12.3	1.300E+00
103	Nb	41	8.017E+07	4.1	1.500E+00
103	Mo	42	3.196E+08	2.6	6.750E+01
103	Tc	43	6.059E+08	1.9	5.420E+01
103	Ru	44	9.190E+07	1.7	3.392E+06
103	Pd	46	1.253E+05	70.8	1.468E+06
104	Zr	40	3.282E+06	19.4	1.200E+00
104	Nb	41	3.009E+07	6.3	4.800E+00
104	Mo	42	2.870E+08	2.7	6.000E+01
104	Tc	43	5.583E+08	1.9	1.098E+03
104	Rh	45	2.297E+07	7	4.230E+01
105	Nb	41	2.721E+07	8.1	2.950E+00
105	Mo	42	1.473E+08	4	3.560E+01
105	Tc	43	4.995E+08	2.1	4.560E+02
105	Ru	44	6.953E+08	1.8	1.598E+04
105	Rh	45	7.557E+08	1.6	1.273E+05
105	Ag	47	2.821E+04	70	3.567E+06
106	Nb	41	7.069E+06	13	1.020E+00
106	Mo	42	9.856E+07	4.4	8.400E+00
106	Tc	43	3.058E+08	2.6	3.600E+01
106	Ru	44	9.624E+06	1.9	3.228E+07
106	Rh	45	6.599E+07	3.6	2.980E+01
106	Ag	47	1.124E+05	99	1.438E+03
107	Nb	41	7.985E+05	17.6	3.300E-01
107	Mo	42	3.480E+07	7.2	3.500E+00
107	Tc	43	2.623E+08	2.9	2.120E+01
107	Ru	44	5.419E+08	2	2.250E+02
107	Rh	45	7.851E+08	1.7	1.302E+03

108	Mo	42	1.587E+07	9.5	1.500E+00
108	Tc	43	1.143E+08	4.2	5.170E+00
108	Ru	44	4.782E+08	2.2	2.730E+02
108	Rh	45	5.955E+08	1.9	1.680E+01
108	Ag	47	4.589E+06	15.9	1.422E+02
109	Mo	42	1.703E+06	19.9	5.300E-01
109	Tc	43	4.669E+07	5.1	8.700E-01
109	Ru	44	1.941E+08	3	3.450E+01
109	Rh	45	6.673E+08	1.4	8.000E+01
109	Pd	46	8.082E+08	1.2	4.932E+04
109	Cd	48	1.340E+04	25.8	3.997E+07
110	Mo	42	4.463E+05	21.4	3.000E-01
110	Tc	43	1.892E+07	7.4	9.200E-01
110	Ru	44	2.169E+08	3.2	1.460E+01
110	Rh	45	1.153E+08	2.9	3.200E+00
110	Ag	47	2.756E+07	5.8	2.460E+01
111	Tc	43	2.209E+06	10	3.000E-01
111	Ru	44	7.690E+07	4.7	2.120E+00
111	Rh	45	3.821E+08	2.4	1.100E+01
111	Pd	46	6.114E+08	1.7	1.404E+03
111	Ag	47	4.057E+08	1.5	6.437E+05
111	In	49	3.875E+05	50.1	2.423E+05
112	Tc	43	4.352E+05	19.9	2.800E-01
112	Ru	44	4.508E+07	5.6	1.750E+00
112	Rh	45	1.401E+08	3.3	3.800E+00
112	Pd	46	6.141E+08	1.7	7.571E+04
112	Ag	47	7.534E+08	1.6	1.127E+04
112	In	49	1.349E+06	28.6	8.982E+02
113	Tc	43	1.414E+04	31.2	1.300E-01
113	Ru	44	1.007E+07	10.1	8.000E-01
113	Rh	45	1.435E+08	3.4	2.720E+00
113	Pd	46	3.378E+08	2.1	9.300E+01
113	Ag	47	6.215E+08	1.4	1.933E+04
114	Ru	44	4.600E+06	11.7	5.700E-01
114	Rh	45	3.920E+07	5.2	1.850E+00
114	Pd	46	3.357E+08	2.5	1.452E+02
114	Ag	47	5.483E+08	2	4.600E+00
114	In	49	1.421E+07	7.3	7.190E+01
115	Ru	44	5.169E+05	29.4	4.000E-01
115	Rh	45	2.375E+07	7.1	9.900E-01
115	Pd	46	1.092E+08	3.8	2.500E+01
115	Ag	47	3.380E+08	1.8	1.200E+03
115	Cd	48	5.048E+08	1.5	1.925E+05

115	Sb	51	2.249E+05	99	1.926E+03
116	Rh	45	3.247E+06	12	6.800E-01
116	Pd	46	1.296E+08	3.6	1.180E+01
116	Ag	47	2.481E+08	2.5	1.608E+02
116	In	49	2.548E+07	5.2	1.410E+01
117	Rh	45	2.514E+06	13.3	4.400E-01
117	Pd	46	4.327E+07	5.3	4.300E+00
117	Ag	47	1.358E+08	2.8	7.280E+01
117	Cd	48	2.462E+08	2	8.964E+03
117	In	49	4.592E+08	1.4	2.592E+03
117	Sb	51	8.997E+05	49.6	1.008E+04
118	Pd	46	2.393E+07	8.6	2.400E+00
118	Ag	47	8.692E+07	3.4	3.760E+00
118	Cd	48	4.003E+08	2.3	3.018E+03
118	In	49	4.448E+08	2.1	5.000E+00
118	Sb	51	2.130E+06	23.3	2.160E+02
119	Pd	46	4.553E+06	15.3	9.200E-01
119	Ag	47	4.312E+07	5.5	6.000E+00
119	Cd	48	1.213E+08	3.3	1.614E+02
119	In	49	2.510E+08	2.1	1.440E+02
119	Sb	51	1.407E+07	12.2	1.375E+05
119	Te	52	2.249E+05	70.6	5.771E+04
120	Pd	46	9.560E+05	23.6	5.000E-01
120	Ag	47	1.585E+07	7.1	1.230E+00
120	Cd	48	1.803E+08	3.2	5.080E+01
120	In	49	2.266E+08	2.6	3.080E+00
120	Sb	51	1.562E+07	8.6	9.534E+02
121	Ag	47	8.047E+06	11	7.800E-01
121	Cd	48	4.498E+07	5.9	1.350E+01
121	In	49	1.358E+08	2.8	2.310E+01
121	Sn	50	3.076E+08	1.9	9.742E+04
121	Te	52	7.722E+05	21.6	1.450E+06
122	Ag	47	1.076E+06	18.7	5.600E-01
122	Cd	48	4.396E+07	6.4	5.300E+00
122	In	49	7.271E+07	4.5	1.500E+00
122	Sb	51	7.059E+07	4.1	2.333E+05
122	I	53	1.121E+06	44.4	2.178E+02
123	Ag	47	3.342E+05	26	3.090E-01
123	Cd	48	1.118E+07	9.3	2.100E+00
123	In	49	5.881E+07	3.9	5.980E+00
123	Sn	50	2.533E+06	4.1	1.116E+07
123	I	53	4.274E+06	22.1	4.777E+04
124	Ag	47	2.890E+04	57.7	2.200E-01

124	Cd	48	5.993E+06	14.5	1.240E+00
124	In	49	2.713E+07	7.1	3.170E+00
124	Sb	51	7.878E+06	2.5	5.201E+06
124	I	53	5.123E+06	18	3.612E+05
125	Cd	48	6.582E+05	26.5	6.500E-01
125	In	49	1.533E+07	7.6	2.360E+00
125	Sn	50	2.246E+07	4.6	8.329E+05
125	Sb	51	1.090E+06	3.3	8.698E+07
125	I	53	1.569E+06	10.9	5.133E+06
125	Xe	54	1.349E+06	33.2	6.084E+04
126	Cd	48	4.573E+05	34.9	5.060E-01
126	In	49	3.428E+06	15.1	1.600E+00
126	Sb	51	1.513E+07	4	1.077E+06
126	I	53	9.310E+06	9.1	1.133E+06
126	Cs	55	2.234E+05	99	9.840E+01
127	Cd	48	3.976E+04	99	4.000E-01
127	In	49	1.684E+06	19.8	1.150E+00
127	Sn	50	1.548E+07	8.7	7.560E+03
127	Sb	51	9.604E+07	4.1	3.326E+05
127	Te	52	1.278E+08	3.1	3.366E+04
127	Xe	54	9.521E+05	13.2	3.145E+06
127	Cs	55	2.249E+05	99	2.250E+04
128	In	49	2.837E+05	46.7	8.000E-01
128	Sn	50	2.071E+07	7.7	3.546E+03
128	Sb	51	3.197E+07	5.5	3.244E+04
128	I	53	6.003E+07	6.6	1.499E+03
128	Cs	55	1.996E+06	36.5	2.172E+02
128	Ba	56	2.020E+05	99	2.100E+05
129	In	49	1.123E+05	57.5	6.300E-01
129	Sn	50	3.542E+06	17.5	1.440E+02
129	Sb	51	3.193E+07	5.8	1.584E+04
129	Te	52	9.148E+07	3.3	4.176E+03
129	Cs	55	3.321E+06	28.1	1.154E+05
129	Ba	56	1.125E+05	99	8.028E+03
130	In	49	1.719E+04	70.4	3.200E-01
130	Sn	50	1.910E+06	22.9	2.232E+02
130	Sb	51	1.517E+07	9.1	2.370E+03
130	I	53	6.312E+07	3.9	4.450E+04
130	Cs	55	9.663E+06	10.9	1.753E+03
131	Sn	50	4.448E+05	49.7	6.100E+01
131	Sb	51	1.596E+07	11.6	1.380E+03
131	Te	52	4.981E+07	4.8	1.500E+03
131	I	53	8.099E+07	3.2	6.947E+05

131	Cs	55	7.980E+06	11.3	8.372E+05
131	Ba	56	9.271E+05	21	1.020E+06
132	Sn	50	6.631E+05	57.6	3.970E+01
132	Sb	51	3.584E+06	18.2	1.674E+02
132	Te	52	4.960E+07	5.5	2.768E+05
132	I	53	1.187E+08	3.3	8.262E+03
132	Cs	55	1.229E+07	10.1	5.598E+05
132	La	57	7.918E+05	35.5	1.728E+04
133	Sb	51	1.791E+06	20.1	1.500E+02
133	Te	52	1.259E+07	9.1	7.500E+02
133	I	53	1.094E+08	3.1	7.488E+04
133	Xe	54	1.030E+08	2.4	4.530E+05
133	Ba	56	1.415E+04	10.5	3.318E+08
133	La	57	1.350E+06	40.4	1.408E+04
134	Sb	51	1.493E+05	57.2	8.500E-01
134	Te	52	1.394E+07	12.2	2.508E+03
134	I	53	6.038E+07	4.5	3.156E+03
134	Cs	55	3.332E+05	4.9	6.503E+07
134	La	57	1.796E+06	34.9	3.870E+02
135	Te	52	5.909E+06	18.1	1.900E+01
135	I	53	5.092E+07	7	2.365E+04
135	Xe	54	1.355E+08	3.5	3.290E+04
135	La	57	4.942E+06	20.2	7.020E+04
135	Ce	58	2.248E+05	70	6.372E+04
136	Sb	51	9.660E+04	99	8.200E-01
136	Te	52	2.331E+06	29.7	1.750E+01
136	I	53	9.092E+06	12.5	8.340E+01
136	Cs	55	2.065E+07	4	1.137E+06
136	La	57	7.190E+06	11.7	5.922E+02
137	Te	52	1.703E+05	99	2.490E+00
137	I	53	1.052E+07	16.3	2.450E+01
137	Xe	54	4.202E+07	7.5	2.291E+02
137	Cs	55	7.436E+04	3.7	9.492E+08
137	Ce	58	1.996E+06	25.9	3.240E+04
137	Pr	59	4.498E+05	70.5	4.608E+03
138	Te	52	2.742E+05	70.7	1.400E+00
138	I	53	5.668E+06	18	6.490E+00
138	Xe	54	3.961E+07	7.8	8.448E+02
138	Cs	55	1.007E+08	3.9	2.005E+03
138	Pr	59	1.116E+05	99	8.700E+01
139	I	53	1.496E+06	32.8	2.290E+00
139	Xe	54	1.223E+07	13.7	3.968E+01
139	Cs	55	7.532E+07	5	5.562E+02

139	Ba	56	1.366E+08	3.9	4.984E+03
139	Ce	58	2.306E+05	13.5	1.189E+07
139	Pr	59	2.249E+05	99	1.588E+04
140	I	53	1.005E+05	99	8.600E-01
140	Xe	54	8.751E+06	16.7	1.360E+01
140	Cs	55	4.413E+07	7	6.370E+01
140	Ba	56	4.370E+07	4.1	1.102E+06
140	La	57	7.015E+07	4.6	1.450E+05
140	Pr	59	2.647E+06	28.3	2.034E+02
140	Nd	60	1.815E+05	99	2.912E+05
141	Xe	54	9.041E+05	40.4	1.730E+00
141	Cs	55	2.803E+07	9.1	2.494E+01
141	Ba	56	7.715E+07	5.3	1.096E+03
141	La	57	1.411E+08	3.9	1.411E+04
141	Ce	58	2.432E+07	3.7	2.808E+06
141	Nd	60	6.746E+05	40.8	8.964E+03
142	Xe	54	7.647E+05	40.4	1.220E+00
142	Cs	55	7.370E+06	14.3	1.700E+00
142	Ba	56	6.818E+07	5.8	6.360E+02
142	La	57	1.195E+08	4.5	5.466E+03
142	Pr	59	4.495E+06	15.2	6.883E+04
143	Xe	54	4.463E+04	70.5	3.000E-01
143	Cs	55	5.082E+06	17	1.780E+00
143	Ba	56	2.957E+07	8.6	1.433E+01
143	La	57	1.014E+08	4.5	8.520E+02
143	Ce	58	1.268E+08	4.1	1.189E+05
143	Pr	59	3.723E+07	3.9	1.172E+06
144	Cs	55	6.229E+05	32.2	1.010E+00
144	Ba	56	2.058E+07	9.5	1.150E+01
144	La	57	6.142E+07	6	4.080E+01
144	Ce	58	2.104E+06	4.4	2.461E+07
144	Pr	59	1.424E+07	8.1	1.037E+03
145	Cs	55	4.202E+05	40.6	5.940E-01
145	Ba	56	5.715E+06	18.1	4.310E+00
145	La	57	4.158E+07	7.5	2.480E+01
145	Ce	58	7.664E+07	5.4	1.806E+02
145	Pr	59	9.589E+07	4.9	2.154E+04
146	Cs	55	2.981E+04	99	3.430E-01
146	Ba	56	3.457E+06	21	2.220E+00
146	La	57	1.157E+07	11	6.270E+00
146	Ce	58	6.023E+07	5.1	8.112E+02
146	Pr	59	7.757E+07	4.7	1.449E+03
146	Pm	61	3.703E+03	40.4	1.744E+08

147	Ba	56	6.210E+05	40.4	8.930E-01
147	La	57	1.131E+07	12.9	4.015E+00
147	Ce	58	3.392E+07	8.1	5.640E+01
147	Pr	59	6.183E+07	5.9	8.040E+02
147	Nd	60	2.655E+07	5.7	9.487E+05
147	Pm	61	8.949E+04	6.5	8.273E+07
148	Ba	56	1.436E+05	70.5	6.070E-01
148	La	57	2.330E+06	22.6	1.050E+00
148	Ce	58	2.383E+07	9.5	5.600E+01
148	Pr	59	3.606E+07	7.2	1.362E+02
148	Pm	61	7.996E+05	29.4	4.640E+05
149	La	57	8.837E+05	37.4	1.200E+00
149	Ce	58	9.600E+06	14	5.200E+00
149	Pr	59	3.295E+07	8.4	1.356E+02
149	Nd	60	4.364E+07	7.2	6.192E+03
149	Pm	61	4.306E+07	7	1.911E+05
149	Eu	63	1.301E+04	99	8.044E+06
150	Ba	56	2.232E+04	99	3.000E-01
150	La	57	2.114E+05	53.9	4.000E-01
150	Ce	58	5.917E+06	17.7	4.000E+00
150	Pr	59	1.976E+07	10	6.190E+00
150	Pm	61	5.398E+06	19.5	9.648E+03
151	Ce	58	1.596E+06	26.2	1.020E+00
151	Pr	59	1.331E+07	12.5	1.890E+01
151	Nd	60	2.428E+07	9.5	7.464E+02
151	Pm	61	3.387E+07	8.2	1.022E+05
151	Sm	62	4.735E+03	8.1	2.838E+09
152	Ce	58	1.079E+06	40.5	3.100E+00
152	Pr	59	4.772E+06	20.3	3.240E+00
152	Nd	60	1.506E+07	12.2	6.840E+02
152	Pm	61	1.657E+07	11.2	2.460E+02
153	Pr	59	2.489E+06	29.5	4.300E+00
153	Nd	60	9.288E+06	15.2	2.890E+01
153	Pm	61	1.663E+07	11.7	3.240E+02
153	Sm	62	1.740E+07	11.2	1.666E+05
154	Pr	59	4.992E+05	57.6	2.300E+00
154	Nd	60	5.928E+06	19.2	2.590E+01
154	Pm	61	8.196E+06	15.3	1.038E+02
155	Nd	60	1.040E+06	44.3	8.900E+00
155	Pm	61	6.889E+06	17.1	4.800E+01
155	Sm	62	7.648E+06	16.4	1.338E+03
155	Eu	63	2.909E+04	15.2	1.476E+08
155	Tb	65	1.389E+05	99	4.596E+05

155	Dy	66	2.249E+05	99	3.600E+04
156	Nd	60	1.982E+05	99	5.470E+00
156	Pm	61	2.636E+06	28.3	2.670E+01
156	Sm	62	4.499E+06	22	3.384E+04
156	Eu	63	1.568E+06	20.1	1.312E+06
157	Pm	61	4.222E+05	70.7	1.090E+01
157	Sm	62	3.370E+06	25.3	4.842E+02
157	Eu	63	5.173E+06	21.3	5.465E+04
158	Sm	62	1.796E+06	34.9	3.306E+02
158	Eu	63	2.024E+06	32.9	2.754E+03
159	Sm	62	4.229E+05	70.6	1.120E+01
159	Eu	63	1.349E+06	40.6	1.086E+03
159	Gd	64	1.573E+06	37.6	6.682E+04
159	Dy	66	8.393E+03	99	1.248E+07
159	Ho	67	2.249E+05	99	1.983E+03
159	Er	68	2.249E+05	99	2.160E+03
159	Tm	69	2.247E+05	99	5.490E+02
160	Sm	62	4.185E+05	70.6	9.600E+00
160	Eu	63	1.333E+06	40.6	3.800E+01
160	Ho	67	2.228E+05	70	1.536E+03
160	Er	68	2.228E+05	70	1.029E+05
160	Tm	69	2.079E+05	70.2	5.640E+02
161	Tb	65	1.245E+05	99	5.944E+05
161	Ho	67	6.748E+05	57.5	8.928E+03
161	Er	68	6.748E+05	57.5	1.156E+04
161	Tm	69	6.747E+05	57.5	1.980E+03
161	Yb	70	2.243E+05	99	2.520E+02
162	Eu	63	4.214E+05	70	1.060E+01
162	Gd	64	4.499E+05	70	5.040E+02
162	Tb	65	6.745E+05	57.2	4.560E+02
162	Tm	69	1.104E+06	42.5	1.302E+03
162	Yb	70	8.992E+05	49.6	1.132E+03
163	Tb	65	2.248E+05	99	1.170E+03
163	Er	68	1.462E+06	36.8	4.500E+03
163	Tm	69	1.462E+06	36.8	6.516E+03
163	Yb	70	1.462E+06	36.8	6.630E+02
163	Lu	71	1.010E+06	43	2.380E+02
163	Hf	72	3.373E+05	57.7	4.000E+01
164	Gd	64	2.215E+05	99	4.500E+01
164	Tb	65	2.249E+05	99	1.800E+02
164	Tm	69	2.001E+06	32.5	1.200E+02
164	Yb	70	1.799E+06	35.3	4.548E+03
164	Lu	71	1.347E+06	40.7	1.884E+02



164	Hf	72	6.706E+05	57.8	1.110E+02
165	Er	68	1.546E+06	33.3	3.730E+04
165	Tm	69	1.556E+06	33.3	1.082E+05
165	Yb	70	1.574E+06	33.3	5.940E+02
165	Lu	71	5.620E+05	52.5	6.444E+02
165	Hf	72	2.229E+05	99	7.600E+01
166	Tm	69	2.600E+06	20.2	2.772E+04
166	Yb	70	2.644E+06	20.2	2.041E+05
166	Lu	71	1.990E+06	25.6	1.590E+02
166	Hf	72	8.990E+05	49.7	4.062E+02
166	Ta	73	4.409E+05	70.6	3.440E+01
167	Tm	69	2.772E+06	18.5	7.992E+05
167	Yb	70	6.186E+06	18.5	1.050E+03
167	Lu	71	5.736E+06	19.2	3.090E+03
167	Hf	72	3.473E+06	24.3	1.230E+02
167	Ta	73	1.007E+06	42.8	8.400E+01
167	W	74	6.517E+05	57.7	1.990E+01
168	Lu	71	7.466E+06	16.9	3.300E+02
168	Hf	72	6.522E+06	18.8	1.557E+03
168	Ta	73	2.690E+06	28.4	1.464E+02
168	W	74	6.661E+05	57.6	5.300E+01
169	Yb	70	1.468E+06	13.2	2.767E+06
169	Lu	71	1.190E+07	13.2	1.226E+05
169	Hf	72	9.880E+06	15.3	1.944E+02
169	Ta	73	4.941E+06	21.8	2.940E+02
169	W	74	1.560E+06	37.3	7.600E+01
170	Lu	71	1.348E+07	12.2	1.728E+05
170	Hf	72	1.394E+07	12.8	5.764E+04
170	Ta	73	9.214E+06	15.4	4.056E+02
170	W	74	4.037E+06	22.7	2.400E+02
171	Lu	71	6.899E+06	11.8	7.119E+05
171	Hf	72	1.417E+07	12.4	4.356E+04
171	Ta	73	1.057E+07	14.4	1.398E+03
171	W	74	2.686E+06	28.2	1.428E+02
172	Lu	71	4.302E+05	35.8	5.789E+05
172	Hf	72	1.578E+05	10.7	5.897E+07
172	Ta	73	1.507E+07	12.2	2.208E+03
172	W	74	4.716E+06	20.9	4.020E+02
173	Lu	71	1.742E+05	10.3	4.320E+07
173	Hf	72	1.927E+07	10.4	8.496E+04
173	Ta	73	1.552E+07	11.6	1.130E+04
173	W	74	4.043E+06	22.8	4.782E+02
174	Ta	73	1.327E+07	13.7	3.780E+03

174	W	74	4.722E+06	23	1.860E+03
175	Hf	72	1.349E+06	10.6	6.048E+06
175	Ta	73	1.530E+07	11.7	3.780E+04
175	W	74	4.722E+06	20.9	2.112E+03
176	Ta	73	1.125E+07	14	2.912E+04
176	W	74	2.249E+06	31	9.000E+03
177	Ta	73	1.362E+07	12.2	2.036E+05
177	W	74	4.274E+06	23.3	8.100E+03
178	Ta	73	5.655E+06	13.2	5.586E+02
178	W	74	7.130E+05	29.7	1.866E+06
179	Ta	73	1.053E+05	12.7	5.645E+07
179	W	74	2.021E+06	28.1	2.250E+03
180	Ta	73	5.132E+06	13.6	2.935E+04
181	W	74	2.012E+04	71	1.047E+07
182	Ta	73	3.402E+04	19.8	9.887E+06

#### Isomers

24	Al	13	2.866E+04	15.8	1.313E-01
26	Al	13	2.007E+09	0.7	6.345E+00
34	Cl	17	1.218E+09	0.9	1.920E+03
38	Cl	17	2.688E+08	1.3	7.150E-01
38	K	19	4.260E+08	1.1	9.239E-01
42	Sc	21	3.108E+09	0.6	6.170E+01
44	Sc	21	3.991E+10	0.2	2.110E+05
45	Sc	21	6.057E+09	0.1	3.180E-01
46	Sc	21	2.140E+10	0.2	1.875E+01
50	Sc	21	6.675E+05	15.8	3.500E-01
50	Mn	25	7.592E+09	0.4	1.050E+02
52	Mn	25	1.365E+11	0.1	1.266E+03
52	Fe	26	1.465E+10	0.3	4.590E+01
53	Fe	26	6.261E+10	0.1	1.548E+02
53	Co	27	9.074E+06	2.9	2.470E-01
54	Co	27	9.932E+09	0.3	8.880E+01
58	Mn	25	2.860E+07	6.5	6.530E+01
58	Co	27	8.884E+10	0.1	3.294E+04
60	Mn	25	5.322E+05	37.4	1.770E+00
60	Co	27	5.937E+09	0.4	6.280E+02
62	Co	27	5.152E+08	1.4	8.346E+02
68	Cu	29	2.579E+06	21.8	2.250E+02
69	Zn	30	1.912E+06	24.9	4.954E+04
70	Cu	29	5.066E+06	14.7	3.300E+01
71	Zn	30	5.511E+06	14.4	1.426E+04
72	Br	35	1.054E+06	31.1	1.060E+01

73	Zn	30	8.383E+06	10.9	5.800E+00
73	Ge	32	5.344E+07	6.1	4.990E-01
73	Se	34	1.678E+08	2.7	2.388E+03
74	Ga	31	3.989E+07	6	9.500E+00
74	Br	35	7.489E+07	3.7	2.760E+03
75	Ge	32	7.393E+06	11.6	4.770E+01
76	Br	35	3.689E+08	1.2	1.310E+00
77	Zn	30	3.022E+06	14.6	1.050E+00
77	Ge	32	7.832E+07	4.5	5.290E+01
77	Se	34	6.069E+07	3.9	1.736E+01
77	Br	35	7.122E+08	1.2	2.568E+02
78	Rb	37	2.264E+08	2	3.444E+02
79	Ge	32	2.779E+07	5.7	3.900E+01
79	Se	34	1.720E+08	3.2	2.352E+02
79	Br	35	2.051E+08	2.2	4.860E+00
79	Kr	36	1.916E+09	0.7	5.000E+01
80	Br	35	6.186E+07	4.5	1.591E+04
81	Ge	32	1.941E+07	7.2	7.600E+00
81	Se	34	3.282E+07	5.5	3.437E+03
81	Kr	36	5.488E+08	1.3	1.310E+01
81	Rb	37	4.181E+09	0.5	1.830E+03
82	As	33	3.613E+07	5.1	1.360E+01
82	Br	35	2.503E+07	6.8	3.678E+02
82	Rb	37	2.405E+09	0.7	2.330E+04
83	Se	34	1.193E+08	3.5	7.010E+01
83	Kr	36	3.537E+08	2.2	6.588E+03
83	Sr	38	7.288E+09	0.4	4.950E+00
83	Y	39	2.279E+09	0.7	1.710E+02
84	As	33	7.047E+06	6.6	6.500E-01
84	Br	35	5.197E+07	4.7	3.600E+02
84	Rb	37	5.452E+08	1.4	1.216E+03
84	Y	39	6.380E+09	0.4	2.400E+03
85	Kr	36	3.248E+08	2.5	1.613E+04
85	Sr	38	4.909E+09	0.5	4.058E+03
85	Y	39	1.263E+10	0.3	1.750E+04
85	Zr	40	3.113E+09	0.6	1.090E+01
86	Rb	37	8.018E+07	3.5	6.102E+01
86	Y	39	1.263E+10	0.3	2.880E+03
87	Sr	38	6.958E+08	1.2	1.009E+04
87	Y	39	1.131E+10	0.3	4.813E+04
87	Zr	40	1.818E+10	0.2	1.400E+01
87	Nb	41	2.644E+09	0.6	1.560E+02
88	Nb	41	7.975E+09	0.4	4.680E+02

88	Tc	43	1.297E+06	31.1	5.800E+00
89	Y	39	7.117E+10	0.1	1.606E+01
89	Zr	40	2.266E+10	0.2	2.508E+02
89	Nb	41	1.817E+10	0.3	4.248E+03
89	Mo	42	4.747E+07	0.8	1.900E-01
89	Tc	43	8.740E+06	11.1	1.290E+01
90	Rb	37	8.124E+07	3.4	2.580E+02
90	Y	39	5.352E+08	1.5	1.148E+04
90	Zr	40	8.058E+09	0.2	8.092E-01
90	Nb	41	2.527E+10	0.2	1.881E+01
90	Tc	43	7.386E+07	3.9	4.920E+01
91	Y	39	4.042E+08	1.6	2.983E+03
91	Nb	41	3.351E+09	0.2	5.258E+06
91	Mo	42	1.700E+10	0.2	6.500E+01
91	Tc	43	3.075E+08	1.8	1.980E+02
92	Nb	41	7.122E+09	0.2	8.770E+05
93	Y	39	1.206E+08	2.4	8.200E-01
93	Nb	41	2.063E+07	0.2	5.087E+08
93	Mo	42	1.950E+10	0.2	2.466E+04
93	Tc	43	3.745E+09	0.5	2.610E+03
94	Nb	41	5.520E+09	0.5	3.758E+02
94	Tc	43	4.024E+09	0.5	3.120E+03
95	Nb	41	3.426E+09	0.5	3.118E+05
95	Tc	43	3.614E+08	0.5	5.270E+06
96	Y	39	5.776E+07	4.4	9.600E+00
96	Tc	43	2.772E+09	0.6	3.090E+03
97	Y	39	2.173E+07	4.3	1.170E+00
97	Y	39	2.674E+05	4.6	1.420E-01
97	Nb	41	2.751E+09	0.6	5.270E+01
97	Tc	43	1.287E+08	0.8	7.785E+06
98	Y	39	2.500E+07	5.6	2.000E+00
98	Nb	41	4.315E+08	1.6	3.078E+03
99	Nb	41	8.193E+08	1.2	1.560E+02
99	Tc	43	4.356E+09	0.6	2.164E+04
100	Y	39	5.219E+06	9.9	9.400E-01
100	Nb	41	8.285E+07	3.3	2.990E+00
101	Rh	45	2.434E+05	57.6	3.750E+05
102	Y	39	2.678E+05	21.2	3.000E-01
102	Nb	41	5.887E+07	3.5	4.300E+00
102	Tc	43	8.806E+07	3.8	2.610E+02
102	Rh	45	5.877E+03	31.1	9.145E+07
103	Rh	45	9.648E+07	1.8	3.367E+03
104	Nb	41	1.329E+07	6.4	9.200E-01

104	Rh	45	1.155E+07	9.9	2.604E+02
105	Rh	45	2.344E+08	1.7	4.000E+01
105	Ag	47	1.123E+05	99	4.338E+02
106	Rh	45	5.769E+07	4.2	7.800E+03
106	Ag	47	5.408E+04	99	7.309E+05
107	Pd	46	1.992E+07	7.2	2.130E+01
107	Ag	47	1.882E+06	23.4	4.430E+01
108	Rh	45	1.230E+08	3.1	3.600E+02
109	Ru	44	9.192E+07	3.1	1.300E+01
109	Rh	45	9.704E+07	3	1.600E-06
109	Pd	46	6.866E+07	3.9	2.818E+02
109	Ag	47	8.241E+08	1.2	3.960E+01
110	Rh	45	3.657E+08	2.2	2.850E+01
110	Ag	47	6.223E+05	5.8	2.158E+07
111	Pd	46	1.223E+08	3	1.980E+04
111	Ag	47	6.990E+08	1.6	6.480E+01
111	Cd	48	7.840E+06	11.9	2.912E+03
111	In	49	2.246E+05	70.9	4.620E+02
112	Rh	45	8.217E+07	3.7	6.800E+00
112	In	49	6.745E+05	40.4	1.234E+03
113	Pd	46	7.856E+07	3	1.000E+02
113	Pd	46	7.848E+06	3	3.000E-01
113	Ag	47	1.992E+08	2.1	6.870E+01
113	Cd	48	5.113E+04	4.4	4.447E+08
113	In	49	5.061E+06	15.9	5.970E+03
114	Rh	45	2.583E+07	5.1	1.850E+00
114	In	49	7.230E+05	10.8	4.278E+06
115	Pd	46	5.901E+07	4.4	5.000E+01
115	Ag	47	1.855E+08	2.4	1.800E+01
115	Cd	48	1.165E+07	3.2	3.853E+06
115	In	49	5.260E+08	1.5	1.615E+04
116	Rh	45	3.332E+06	12.3	9.000E-01
116	Ag	47	9.733E+07	3.5	8.600E+00
116	In	49	5.353E+07	3.7	3.265E+03
116	In	49	1.948E+07	5.2	2.180E+00
117	Ag	47	1.162E+08	2.9	5.340E+00
117	Cd	48	2.169E+08	2.1	1.210E+04
117	In	49	3.081E+08	1.7	6.972E+03
117	Sn	50	5.754E+06	7.5	1.175E+06
118	Ag	47	5.254E+07	4.1	2.000E+00
118	In	49	1.034E+08	2.9	2.670E+02
118	In	49	4.803E+07	4.1	8.500E+00
118	Sb	51	2.137E+06	23.3	1.800E+04

119	Ag	47	3.377E+07	5.6	6.000E+00
119	Cd	48	1.115E+08	3.3	1.320E+02
119	In	49	2.336E+08	2.2	1.080E+03
119	Sn	50	7.457E+05	5.2	2.532E+07
119	Te	52	1.558E+05	70.6	4.061E+05
120	Ag	47	1.753E+06	9.1	3.200E-01
120	In	49	5.496E+07	3.7	4.620E+01
120	In	49	5.497E+07	3.7	4.730E+01
120	Sb	51	9.664E+06	8.6	4.977E+05
121	Cd	48	2.493E+07	6.4	8.300E+00
121	In	49	1.247E+08	3	2.328E+02
121	Sn	50	2.257E+04	3.1	1.734E+09
121	Te	52	9.547E+04	22	1.331E+07
122	Ag	47	1.771E+06	19	1.500E+00
122	In	49	3.610E+07	4.3	1.030E+01
122	In	49	3.621E+07	4.3	1.080E+01
122	Sb	51	4.038E+07	5.7	2.526E+02
123	Cd	48	4.918E+06	12.9	1.820E+00
123	In	49	5.264E+07	4.1	4.780E+01
123	Sn	50	1.736E+08	2.4	2.404E+03
123	Te	52	6.415E+05	8.4	1.034E+07
124	In	49	1.752E+07	7.4	3.400E+00
124	Sb	51	7.142E+07	3	9.300E+01
124	Sb	51	3.582E+07	4.2	1.212E+03
125	Cd	48	4.334E+05	27	5.700E-01
125	In	49	1.682E+07	8.1	1.220E+01
125	Sn	50	5.388E+07	4.5	5.712E+02
125	Te	52	3.077E+06	5.9	4.959E+06
125	Xe	54	6.667E+05	47	5.700E+01
126	In	49	4.965E+06	14.9	1.640E+00
126	Sb	51	6.581E+07	3.5	1.149E+03
126	Sb	51	3.091E+07	5	1.100E+01
127	In	49	2.534E+06	19.7	3.760E+00
127	Sn	50	1.688E+07	8.3	2.478E+02
127	Te	52	2.931E+06	4.1	9.418E+06
127	Xe	54	3.229E+06	18.8	6.920E+01
128	In	49	2.507E+05	46.7	7.000E-01
128	Sn	50	8.997E+06	11	6.500E+00
128	Sb	51	5.082E+07	4.6	6.240E+02
129	In	49	1.921E+05	57.5	1.230E+00
129	Sn	50	2.955E+06	19.2	4.140E+02
129	Sb	51	2.540E+07	6.5	1.062E+03
129	Te	52	6.306E+06	4.9	2.903E+06

129	Xe	54	5.324E+06	10.2	7.681E+05
129	Ba	56	1.125E+05	99	7.812E+03
130	In	49	4.155E+04	70.4	5.400E-01
130	In	49	4.155E+04	70.4	5.400E-01
130	Sn	50	1.890E+06	23	1.020E+02
130	Sb	51	1.516E+07	9.1	3.780E+02
130	I	53	3.426E+07	5.5	5.400E+02
130	Cs	55	4.820E+06	15.4	2.076E+02
131	Sn	50	4.420E+05	49.7	3.900E+01
131	Te	52	2.919E+07	5.5	1.080E+05
131	Xe	54	9.490E+06	6.8	1.028E+06
131	Ba	56	1.236E+06	29.6	8.760E+02
132	Sb	51	4.264E+06	17.9	2.460E+02
132	I	53	3.734E+07	5.7	4.993E+03
132	La	57	4.497E+05	49.8	1.458E+03
133	Te	52	1.008E+07	10.9	3.324E+03
133	I	53	4.206E+07	4.7	9.000E+00
133	Xe	54	3.556E+07	5	1.892E+05
133	Ba	56	4.787E+06	14.5	1.400E+05
134	Sb	51	3.157E+05	57.2	1.043E+01
134	I	53	2.486E+07	6.2	2.214E+02
134	Xe	54	5.498E+06	4.1	2.900E-01
134	Cs	55	2.294E+07	6.9	1.048E+04
135	Xe	54	5.015E+07	4.4	9.174E+02
135	Cs	55	3.733E+07	5.6	3.180E+03
135	Ba	56	1.214E+07	10.1	1.033E+05
135	Ce	58	1.086E+05	99	2.000E+01
136	I	53	6.649E+06	13.3	4.690E+01
136	Cs	55	3.861E+07	5.4	1.900E+01
136	Ba	56	4.523E+06	4.3	3.084E-01
136	La	57	8.233E+03	16.5	1.140E-01
137	Ba	56	2.907E+07	6.4	1.531E+02
137	Ce	58	7.709E+05	37.4	1.238E+05
138	Cs	55	3.361E+07	5.4	1.746E+02
138	Pr	59	1.125E+05	99	7.632E+03
139	Ce	58	2.776E+06	19	5.480E+01
141	Nd	60	3.337E+05	57.6	6.200E+01
142	Pr	59	2.248E+06	21.5	8.760E+02
144	Cs	55	6.186E+05	32.2	1.000E+00
144	Pr	59	6.095E+06	13.4	4.320E+02
146	La	57	7.241E+06	11.8	1.000E+01
148	Pr	59	1.197E+07	10.6	1.200E+02
148	Pm	61	1.555E+05	29.5	3.567E+06

150	Eu	63	1.125E+05	99	4.608E+04
152	Pm	61	1.722E+06	19.9	4.512E+02
152	Pm	61	1.723E+06	19.9	8.280E+02
152	Eu	63	2.249E+05	57.2	3.339E+04
152	Eu	63	2.249E+05	57.2	5.760E+03
154	Pm	61	2.128E+06	22.1	1.608E+02
154	Eu	63	4.498E+05	49.8	2.778E+03
158	Tb	65	1.053E+05	99	1.050E+01
160	Tm	69	1.114E+05	99	7.450E+01
162	Tm	69	1.093E+05	99	2.430E+01
164	Tm	69	1.122E+05	99	3.060E+02
165	Lu	71	3.371E+05	57.5	7.200E+02
166	Lu	71	6.693E+05	32.8	8.460E+01
166	Lu	71	6.712E+05	32.8	1.272E+02
168	Lu	71	8.982E+05	34.9	4.020E+02
169	Lu	71	1.120E+06	34.1	1.600E+02
170	Lu	71	1.599E+05	49.8	6.700E-01
171	Lu	71	4.460E+05	49.5	7.900E+01
172	Lu	71	3.364E+05	57.4	2.220E+02
174	Lu	71	8.615E+03	70.8	1.227E+07
177	Hf	72	7.893E+05	22.6	1.080E+00
177	Hf	72	1.499E+06	22.6	3.084E+03
178	Hf	72	7.566E+05	28.2	4.000E+00
178	Ta	73	4.948E+06	14.4	8.496E+03
179	Hf	72	6.502E+05	32.8	1.867E+01
179	Hf	72	1.338E+05	32.8	2.169E+06
179	W	74	1.010E+06	39.7	3.840E+02
180	Hf	72	5.623E+05	44.6	1.980E+04
182	Ta	73	2.605E+05	31.8	2.830E-01
182	Ta	73	2.397E+05	34.4	9.504E+02

Inconel 625 Ring					
A	Sym.	Z	Bq	Err. (%)	T 1/2 (s)
3	H	1	2.419E+05	3.4	3.888E+08
6	He	2	1.905E+05	70.9	8.067E-01
7	Be	4	1.112E+05	44.3	4.604E+06
11	C	6	2.248E+05	99	1.223E+03
13	N	7	1.715E+05	70.6	5.979E+02
23	Ne	10	4.416E+05	70.6	3.724E+01
24	Na	11	7.382E+05	28.5	5.385E+04



27	Mg	12	2.704E+06	21.3	5.675E+02
28	Al	13	5.275E+06	14.5	1.345E+02
29	Al	13	1.927E+05	73	3.936E+02
31	Si	14	6.605E+04	73.6	9.438E+03
32	P	15	6.413E+04	62.7	1.232E+06
35	S	16	1.381E+04	99	7.561E+06
43	K	19	2.244E+05	99	8.028E+04
44	Sc	21	2.114E+05	70.1	1.414E+04
44	Ti	22	1.395E+02	70.4	1.545E+09
45	Ca	20	1.498E+04	70.9	1.415E+07
45	Ti	22	1.799E+06	34.9	1.109E+04
46	Sc	21	2.697E+05	15.2	7.239E+06
47	Sc	21	3.506E+06	23.4	2.890E+05
47	V	23	1.124E+06	44.3	1.956E+03
48	Sc	21	1.193E+06	41.1	1.572E+05
48	V	23	5.052E+06	11.1	1.380E+06
48	Cr	24	6.734E+05	57.3	7.762E+04
49	V	23	1.199E+06	5.4	2.920E+07
49	Cr	24	1.334E+07	12.3	2.538E+03
50	Sc	21	2.210E+05	70	1.025E+02
51	Ti	22	8.037E+05	46.7	3.456E+02
51	Cr	24	8.732E+07	2	2.393E+06
51	Mn	25	4.048E+06	22.8	2.772E+03
52	V	23	1.022E+08	3.8	2.250E+02
52	Mn	25	7.544E+06	9.7	4.831E+05
52	Fe	26	3.374E+05	57.3	2.979E+04
53	V	23	5.728E+06	16	9.660E+01
53	Fe	26	9.116E+06	10.7	5.106E+02
54	V	23	7.030E+05	51.3	4.980E+01
54	Mn	25	1.496E+06	4.7	2.697E+07
54	Co	27	6.227E+03	70.6	1.932E-01
55	Cr	24	1.001E+06	26.2	2.098E+02
55	Fe	26	3.261E+06	1.6	8.609E+07
55	Co	27	8.768E+06	15.2	6.311E+04
56	Mn	25	2.481E+07	7.6	9.283E+03
56	Co	27	1.212E+07	3.7	6.676E+06
56	Ni	28	2.330E+06	24.9	5.098E+05
57	Mn	25	8.577E+05	43.5	8.540E+01
57	Co	27	2.606E+07	1.1	2.348E+07
57	Ni	28	1.037E+08	4.4	1.282E+05
58	Mn	25	8.927E+04	99	3.000E+00
58	Co	27	2.715E+08	0.4	6.119E+06
58	Cu	29	1.631E+06	32.8	3.204E+00

59	Fe	26	3.596E+05	22.5	3.845E+06
59	Ni	28	8.220E+01	1.7	2.397E+12
59	Cu	29	2.230E+05	99	8.150E+01
60	Co	27	3.589E+05	2	1.662E+08
60	Cu	29	1.349E+06	40.5	1.422E+03
61	Fe	26	1.301E+05	99	3.588E+02
61	Co	27	1.092E+07	12.7	5.940E+03
61	Cu	29	4.499E+05	70.6	1.200E+04
62	Co	27	1.656E+06	23.5	9.000E+01
62	Cu	29	1.434E+06	34.2	5.844E+02
63	Co	27	8.773E+05	49.7	2.740E+01
63	Ni	28	4.345E+03	6.4	3.157E+09
64	Cu	29	1.988E+06	28.5	4.572E+04
65	Ni	28	1.339E+06	18.1	9.062E+03
66	Cu	29	3.080E+05	42.8	3.053E+02
84	Rb	37	3.498E+04	70	2.831E+06
85	Sr	38	1.794E+04	70	5.602E+06
85	Y	39	1.125E+05	99	9.648E+03
86	Y	39	4.483E+05	50.2	5.306E+04
87	Y	39	1.778E+06	22.1	2.873E+05
87	Zr	40	4.499E+05	50	6.048E+03
88	Y	39	9.843E+04	32.4	9.215E+06
88	Zr	40	2.807E+05	21.5	7.206E+06
88	Nb	41	1.124E+05	99	8.700E+02
89	Zr	40	7.159E+06	10.7	2.823E+05
89	Nb	41	1.912E+06	23.6	6.840E+03
89	Mo	42	2.238E+05	70	1.224E+02
90	Y	39	1.327E+06	21.2	2.308E+05
90	Nb	41	1.777E+07	8	5.256E+04
90	Mo	42	2.699E+06	28.3	2.041E+04
91	Y	39	4.026E+04	49.7	5.055E+06
91	Nb	41	1.172E+03	4.5	2.144E+10
91	Mo	42	1.544E+07	7	9.294E+02
92	Tc	43	4.487E+05	70.2	2.538E+02
93	Mo	42	2.095E+02	3.8	1.261E+11
93	Tc	43	5.962E+05	41	9.900E+03
94	Nb	41	3.196E+01	2.6	6.402E+11
94	Tc	43	6.755E+05	40.4	1.758E+04
95	Zr	40	4.708E+04	37.5	5.531E+06
95	Nb	41	6.763E+05	13.7	3.022E+06
95	Tc	43	5.632E+05	44.3	7.200E+04
96	Nb	41	4.370E+06	22.4	8.406E+04
96	Tc	43	6.459E+05	35.2	3.698E+05

97	Y	39	1.146E+05	70	3.750E+00
97	Zr	40	2.247E+05	57.2	6.084E+04
97	Nb	41	4.542E+06	15.9	4.326E+03
98	Nb	41	5.645E+05	38.4	2.860E+00
99	Nb	41	5.507E+05	43.2	1.500E+01
99	Mo	42	3.754E+07	4.3	2.374E+05
100	Nb	41	2.409E+05	52.1	1.500E+00
101	Mo	42	5.379E+06	8.2	8.766E+02
101	Tc	43	5.384E+06	8.2	8.532E+02
180	Ta	73	1.118E+05	70.6	2.935E+04
182	Ta	73	7.071E+03	45.6	9.887E+06

#### Isomers

26	Al	13	4.082E+05	46.1	6.345E+00
44	Sc	21	1.009E+05	99	2.110E+05
45	Sc	21	2.561E+05	21.1	3.180E-01
46	Sc	21	2.029E+06	21.5	1.875E+01
50	Sc	21	1.552E+04	99	3.500E-01
52	Mn	25	1.113E+07	10.1	1.266E+03
52	Fe	26	3.324E+05	57.3	4.590E+01
53	Fe	26	4.541E+06	15.2	1.548E+02
54	Co	27	2.232E+05	70.6	8.880E+01
58	Mn	25	1.113E+05	99	6.530E+01
58	Co	27	1.864E+09	0.5	3.294E+04
60	Co	27	6.240E+07	2.9	6.280E+02
62	Co	27	1.651E+06	23.7	8.346E+02
84	Rb	37	1.124E+05	99	1.216E+03
85	Y	39	1.125E+05	99	1.750E+04
86	Y	39	2.249E+05	70.9	2.880E+03
87	Y	39	8.997E+05	34.8	4.813E+04
87	Zr	40	2.141E+05	70.7	1.400E+01
88	Nb	41	1.123E+05	99	4.680E+02
89	Y	39	8.438E+06	10	1.606E+01
89	Zr	40	2.667E+06	19.3	2.508E+02
89	Nb	41	1.687E+06	25.1	4.248E+03
89	Mo	42	2.929E+03	99	1.900E-01
90	Y	39	7.614E+05	30	1.148E+04
90	Zr	40	3.266E+06	11.7	8.092E-01
90	Nb	41	7.263E+06	11.3	1.881E+01
91	Y	39	2.249E+05	70.2	2.983E+03
91	Nb	41	2.668E+06	6.3	5.258E+06
91	Mo	42	1.018E+07	9.4	6.500E+01
92	Nb	41	2.612E+07	3.4	8.770E+05

93	Nb	41	6.759E+05	0.8	5.087E+08
93	Mo	42	2.799E+07	5.4	2.466E+04
93	Tc	43	3.373E+05	57.5	2.610E+03
94	Nb	41	2.137E+07	3.7	3.758E+02
94	Tc	43	6.747E+05	40.5	3.120E+03
95	Nb	41	2.448E+06	18.3	3.118E+05
95	Tc	43	4.887E+04	44.4	5.270E+06
96	Tc	43	4.498E+05	49.8	3.090E+03
97	Y	39	4.146E+04	99	1.170E+00
97	Y	39	5.689E+02	99	1.420E-01
97	Nb	41	2.344E+06	21.8	5.270E+01
97	Tc	43	4.028E+04	40.5	7.785E+06
98	Nb	41	7.173E+05	38.5	3.078E+03
99	Nb	41	5.599E+05	44.3	1.560E+02
99	Tc	43	3.257E+07	4.3	2.164E+04
100	Nb	41	3.032E+05	52.1	2.990E+00
182	Ta	73	5.414E+04	73	2.830E-01
182	Ta	73	4.982E+04	79.1	9.504E+02