

This is a compilation of all near-barrier heavy-ion fusion cross sections measured at INFN - Lab. Naz. di Legnaro, and published on international journals. References are given.

46Ti + 46Ti

A.M. Stefanini, M. Trotta, L. Corradi et al.,
Physical Review, C 65 (2002) 34609

Comments

Beam quality: no data

Target: 46Ti (96.84%): 50 mcg/cm²; carbon backing: 15 mcg/cm²

Detected particles: EvR

Ecm(MeV) sig(mb) error(mb)

58.0	0.45063	0.15000
58.5	0.56050	0.14000
59.0	1.7749	0.27000
59.5	3.2381	0.27000
60.0	5.3274	0.45000
60.5	9.0573	0.49000
61.0	12.738	0.52000
61.5	21.222	0.65000
62.0	29.253	1.0600
62.5	39.851	1.2100
63.0	43.620	2.0700
63.5	62.672	1.5600
64.0	80.740	2.0900
64.5	93.340	2.0700
65.0	113.49	2.1400
65.5	141.35	2.3500
66.0	159.48	2.2700
66.5	171.84	3.5400
67.0	216.01	4.3600
67.5	227.94	2.9900
68.0	273.57	3.2400
68.5	297.02	3.2900
69.0	328.95	3.6400
69.5	338.64	3.8500
70.0	342.62	4.3200
70.5	383.51	4.4400
71.0	372.40	5.6800

36S + 90Zr

A.M. Stefanini, L. Corradi, A.M. Vinodkumar et al.,
Physical Review, C 62 (2000) 14601

Comments

Beam quality: energy uncertainty 1/800

Target: 90ZrO₂ (99.36%): 60 mcg/cm²; carbon layer: 20 mcg/cm²

Detected particles: EvR

Ecm(MeV)	sig(mb)	error(mb)
73.728	0.090305	0.021000
74.227	0.17588	0.053000
74.727	0.87718	0.073700
75.234	2.2816	0.15800
75.727	4.8488	0.27400
76.227	9.1198	0.29500
76.726	17.390	0.76900
77.226	27.347	0.69500
77.726	42.508	1.0325
78.219	61.929	1.2330
78.718	80.771	1.5590
79.225	97.545	1.9180
79.725	117.03	2.2100
80.225	140.18	3.8200
80.725	161.47	3.0030
81.225	176.48	3.3820
81.724	207.48	4.0670
82.231	223.14	4.2250
82.731	251.52	4.7730
83.238	273.36	5.2600
83.738	299.65	5.5400
84.238	317.58	4.7700
84.730	357.35	5.4200
85.095	367.65	4.7000
85.737	392.22	5.2200
86.237	411.50	5.8100
86.737	425.06	6.3800
87.244	469.69	5.0400

36S + 96Zr

A.M. Stefanini, L. Corradi, A.M. Vinodkumar et al.,
Physical Review, C 62 (2000) 14601

Comments

Beam quality: energy uncertainty 1/800

Target: 96Zr₂O₃ (95.63%): 90 mcg/cm²; carbon layer: 15 mcg/cm²

Detected particles: EvR

Ecm(MeV)	sig(mb)	error(mb)
71.107	0.067000	0.011000

71.624	0.22000	0.050000
72.133	0.27000	0.050000
72.642	1.4500	0.10000
73.143	3.8800	0.16000
73.645	9.6500	0.31000
74.154	16.600	0.44000
74.656	26.400	0.65000
75.165	35.300	0.80000
75.673	47.400	1.0000
76.182	67.400	1.4000
76.691	82.800	1.8000
77.200	95.900	1.7000
77.709	122.00	2.4000
78.218	147.50	2.1000
78.727	176.00	3.1000
79.236	200.30	2.5000
79.745	220.90	3.8000
80.246	249.00	4.3000
80.762	273.70	4.8000
81.271	300.40	4.9000
81.780	326.20	5.6000
82.289	344.70	6.1000
82.805	368.70	6.2000
83.314	387.10	7.1000
83.830	400.60	6.5000
84.339	434.00	7.3000
84.841	453.50	6.6000
85.357	482.40	6.2000
85.859	504.40	6.8000
86.368	543.40	7.5000
86.731	545.80	5.7000
87.378	586.20	6.6000

$^{40}\text{Ca} + ^{90}\text{Zr}$

H. Timmers, D. Ackermann, S. Beghini et al.,
Nuclear Physics, A 633 (1998) 421

Comments

Beam quality: 100 keV

Target: ^{90}Zr (99.36%): 50 mcg/cm²; carbon foil 15 mcg/cm²

Detected particles: EvR

Ecm(MeV) sig(mb) error(mb)

134.86	0.84	0.06
135.36	1.05	0.08
135.86	2	0.09
136.37	3.4	0.09
136.87	5.26	0.11
137.37	7.41	0.13

137.87	11	0.2
138.37	15	0.2
138.87	21	0.3
139.37	26.8	0.3
139.87	34.3	0.4
140.37	41.4	0.3
140.87	49.1	0.4
141.37	58.8	0.4
141.87	66.8	0.6
142.37	75.7	0.6
142.87	83.8	0.7
143.37	95	0.6
143.87	104.4	0.8
144.37	117.7	1
144.87	128.1	0.9
145.37	139.2	0.9
145.87	152.7	1
146.37	161.4	1.3
146.87	172.5	1.2
147.38	179.3	1.5
147.88	190.5	1.6
148.38	196.8	1.5
148.88	207.6	1.7
149.38	215.3	1.6
150.38	236.3	2.1
151.38	260.1	2.8
152.38	280.4	2.5
153.38	295	2.5
154.38	315.1	2.3
155.38	335	3
156.38	357.6	2.8
157.38	375.1	2.6
158.38	394.1	4
159.38	407	3.8

$^{40}\text{Ca} + ^{96}\text{Zr}$

H. Timmers, D. Ackermann, S. Beghini et al.,
Nuclear Physics, A 633 (1998) 421

Comments

Beam quality: 100 keV

Target: ^{96}Zr (95.63%): 50 mcg/cm²; carbon foil 15 mcg/cm²

Detected particles: EvR

Ecm(MeV) sig(mb) error(mb)

123.35	0.16	0.03
123.85	0.24	0.04
124.86	0.57	0.04
125.86	1.23	0.07

126.36	1.72	0.1
126.86	2.34	0.09
127.36	3.26	0.11
127.86	3.88	0.1
128.36	5.44	0.15
128.86	6.72	0.15
129.36	9.3	0.2
129.86	10.9	0.2
130.36	13.5	0.2
130.86	16.5	0.3
131.36	19.9	0.3
131.86	23.8	0.4
132.36	28	0.4
132.86	32.8	0.5
133.36	38	0.6
133.86	42.9	0.6
134.36	48.9	0.8
134.86	54.6	0.8
135.36	60.4	0.6
135.86	68.4	0.6
136.37	76.3	0.7
136.87	82	0.7
137.37	91	0.8
137.87	100.1	1
138.37	107.7	0.7
138.87	116.8	1
139.37	125.5	1
139.87	133.2	1
140.37	143.5	1.1
140.87	153.5	1
141.37	162.2	1.2
141.87	173.2	1.3
142.37	182.4	1.4
142.87	193.3	1.9
143.37	203.8	1.9
143.87	214.7	2.1
144.37	223.8	1.6
145.37	242.3	1.7
146.37	261.6	2.2
147.38	281.1	2.4
148.38	298.7	2.5
149.38	314.8	2.8
150.38	333.5	2.6
151.38	351.1	3.1
152.38	366.9	3.5
153.38	382.4	4.3
154.38	402	3
155.38	414.9	3.1
156.38	429.9	3.5
157.38	445	3
158.38	459.2	4.3

159.38 474 4.5

$^{33}\text{S} + ^{90}\text{Zr}$

L. Corradi, S.J. Skorka, U. Lenz et al.,
Zeitschrift fur Physik, A 335 (1990) 55

Comments

Beam quality: 0.7%

Target: $^{90}\text{ZrO}_2$ (97.8%): 82 mcg/cm²; carbon backing 20 mcg/cm²

Detected particles: EvR - Errors include a systematic uncertainty

Ecm(MeV) sig(mb) error(mb)

74.4	0.079	0.049
75.1	0.171	0.094
75.9	0.49	0.19
77.3	3.7	0.74
78.8	26.2	5
80.2	43.5	7.8
81.7	108	19
84.6	187	33
87.5	312	56
89.7	312	56
91.9	423	76
94.1	553	100
96.3	725	130

$^{33}\text{S} + ^{91}\text{Zr}$

L. Corradi, S.J. Skorka, U. Lenz et al.,
Zeitschrift fur Physik, A 335 (1990) 55

Comments

Beam quality: 0.7%

Target: $^{91}\text{ZrO}_2$ (94.6%): 81 mcg/cm²; carbon backing 20 mcg/cm²

Detected particles: EvR - Errors include a systematic uncertainty

Ecm(MeV) sig(mb) error(mb)

73.9	0.062	0.024
74.6	0.235	0.061
75.3	0.85	0.2
75.7	1.14	0.4
76.1	2.18	0.57
77.6	11.7	2.3
78.7	26.6	5.9
80.5	58.2	11.6
81.4	107	21

81.9	122	22
84.9	218	39
87.2	371	67
90	322	58
92.2	407	73
93.7	518	93
96	643	116

33S + 92Zr

L. Corradi, S.J. Skorka, U. Lenz et al.,
Zeitschrift fur Physik, A 335 (1990) 55

Comments

Beam quality: 0.7%

Target: 92ZrO₂ (94.6%): 85 mcg/cm²; carbon backing 20 mcg/cm²

Detected particles: EvR - Errors include a systematic uncertainty

E_{cm}(MeV) sig(mb) error(mb)

72.6	0.049	0.02
73.4	0.129	0.036
74.1	0.56	0.12
74.8	1.71	0.36
75.5	3.63	0.69
76.3	7.4	1.4
77.7	19.9	3.8
79.2	51.3	9.7
80.7	77.9	15
82.2	131	25
85.1	226	41
88.1	368	66
90.3	339	61
92.5	361	65
94.7	528	95
96.9	686	123

48Ca+48Ca

Please notice that the beam energies are lab energies:
the beam energy accuracy is 1/800

Quoted errors are only statistical; the absolute cross section scale is estimated to be
accurate
within +- 15%

Detected particles: evaporation residues

Target: 48CaF₂ 50 mug/cm², enriched to 96.78%, on carbon 15 mug/cm²

Data obtained at the XTU Tandem accelerator of INFN - Laboratori Naz. di Legnaro
M.Trotta, A.M.Stefanini, L.Corradi et al., Phys. Rev. C65, 011601(R) (2001)

Elab(MeV) sigma(mb) error(mb)

119.1	611.32	7.05
118.3	563.00	6.09
117.5	469.67	5.25
116.7	458.14	4.63
115.9	425.04	4.72
115.1	472.19	5.52
114.3	409.76	4.51
113.5	393.81	3.94
112.7	386.20	4.21
111.9	357.22	3.17
111.1	314.61	2.88
110.3	267.66	2.54
109.5	243.33	2.30
108.7	215.99	1.86
107.9	195.36	1.81
107.1	170.87	1.42
106.3	136.62	1.20
105.5	121.93	1.38
104.7	93.45	1.34
103.9	66.73	1.10
103.1	48.94	1.08
102.3	32.67	0.70
101.5	20.16	0.46
100.7	11.69	0.36
99.9	5.61	0.25
99.1	2.51	0.18
98.3	0.88	0.10
97.5	0.41	0.05
96.7	0.15	0.04

$^{40}\text{Ca}+^{48}\text{Ca}$

Please notice that the beam energies are lab (^{40}Ca) energies:
the beam energy accuracy is 1/800

Quoted errors are only statistical; the absolute cross section scale is estimated to be
accurate
within $\pm 15\%$

Detected particles: evaporation residues

Target: $^{48}\text{CaF}_2$ 50 $\mu\text{g}/\text{cm}^2$, enriched to 96.78%, on carbon 15 $\mu\text{g}/\text{cm}^2$

Data obtained at the XTU Tandem accelerator of INFN - Laboratori Naz. di Legnaro
M.Trotta, A.M.Stefanini, L.Corradi et al., Phys. Rev. C65, 011601(R) (2001)

Elab(MeV) sigma(mb) error(mb)

134.80	1004.01	11.39
129.19	966.25	16.35
124.18	906.17	13.26
124.18	907.57	13.49
119.17	853.79	12.05
116.36	782.69	11.79
113.96	694.37	8.25
111.55	624.84	6.80
109.15	521.35	6.18
106.74	459.01	5.17
105.94	376.26	5.20
105.14	387.50	4.16
104.34	345.78	3.74
103.54	364.75	3.86
102.73	307.83	3.12
101.93	291.49	3.76
101.13	250.67	3.30
100.33	232.03	3.27
99.53	197.88	2.98
98.73	170.05	2.54
97.92	143.35	2.65
97.12	118.82	2.38
96.32	87.00	1.65
95.52	65.96	1.28
94.72	53.59	1.45
93.92	38.48	1.39
93.11	26.43	1.06
92.31	14.83	0.73
91.51	9.15	0.83
90.71	6.60	0.68
89.91	3.27	0.31
89.10	2.13	0.23
88.30	1.49	0.43
87.50	0.52	0.11

$^{40}\text{Ca}+^{124}\text{Sn}$

Please notice that the beam energies are center-of-mass energies:
the beam (^{40}Ca) energy accuracy is 1/800

Quoted errors are only statistical; the absolute cross section scale is estimated to be
accurate
within $\pm 15\%$

Detected particles: evaporation residues

Target: ^{124}Sn (metallic) 99.8% enriched 90 $\mu\text{g}/\text{cm}^2$ on carbon backing 15 $\mu\text{g}/\text{cm}^2$

Data obtained at the XTU Tandem accelerator of INFN - Laboratori Naz. di Legnaro
A.M.Stefanini, J.Phys. G23, 1401 (1997)

Ecm(MeV) sigma(mb) error(mb)

107.52	0.44900	0.12386
107.97	0.60383	0.092896
108.27	0.97541	0.13934
108.65	1.3625	0.18579
109.03	1.9353	0.24772
109.48	2.5546	0.30965
109.79	3.1894	0.24772
110.16	4.7842	0.35610
110.54	5.6822	0.40255
110.92	7.6794	0.44900
111.37	10.095	0.58834
111.75	10.884	0.63479
112.05	15.483	0.61931
112.43	19.508	0.77414
112.89	21.552	1.1612
113.26	24.525	1.2386
113.64	30.826	1.6102
113.94	36.183	1.7341
114.32	44.482	1.8424
114.78	47.981	1.8424
115.08	55.087	1.8734
115.46	64.718	1.7495
115.83	69.585	1.0162
116.21	78.408	1.1123
116.67	85.622	1.2127
116.97	94.985	1.0773
117.35	99.469	1.4131
117.72	112.59	1.5847
118.10	121.94	1.6889
118.56	128.37	1.8095
118.86	139.63	1.9281
119.24	145.66	2.0594
119.61	156.16	1.9432
120.07	164.98	2.3207
120.45	172.54	2.4508
120.82	183.25	2.6115
121.20	195.53	2.8310
121.58	199.74	2.8736
121.96	214.40	2.9892
122.26	224.38	4.1803
122.71	231.93	3.3837
123.09	242.68	3.4765
123.47	241.10	3.4872
123.85	248.61	3.4892

124.23	262.94	3.7769
124.60	272.06	3.8419
124.98	279.28	3.7197
125.74	299.11	3.3680
126.50	318.67	4.4449
127.25	320.34	4.8445
128.01	343.45	5.2781
128.76	354.43	6.0042
129.52	355.05	5.7874
130.28	376.14	6.1017
131.03	392.04	4.0750
131.79	403.79	4.2701
132.62	398.76	3.8908

$^{58}\text{Ni}+^{60}\text{Ni}$

Please notice that the beam energy accuracy is 1/800

Quoted errors are only statistical; the absolute cross section scale is estimated to be accurate within $\pm 15\%$

Detected particles: evaporation residues

Target: 100 $\mu\text{g}/\text{cm}^2$, enriched to 99.8%, on carbon 20 $\mu\text{g}/\text{cm}^2$

Data obtained at the XTU Tandem accelerator of INFN - Laboratori Naz. di Legnaro
A.M.Stefanini, D.Ackermann, L. Corradi, Phys. Rev. Lett. 74, 864 (1995)

$E_{\text{cm}}(\text{MeV})$ $\sigma(\text{mb})$ $\text{error}(\text{mb})$

91.606	0.040319	0.0048383
92.622	0.28022	0.015926
93.140	0.71164	0.075599
93.618	1.4082	0.099992
94.096	2.8395	0.11189
94.564	3.6761	0.13608
95.022	5.8826	0.26409
95.510	6.9390	0.27619
97.004	16.954	0.53222
97.512	18.607	0.64108
98.020	24.978	0.60277
98.518	30.703	0.73684
99.016	34.211	0.74792
99.524	43.363	0.84570
100.53	62.566	2.6308
101.53	75.508	1.7539
102.53	91.454	2.2680
105.57	155.91	3.7295
106.59	187.45	5.1206

108.60	225.49	6.5116
109.61	239.14	2.4897
111.64	272.64	4.4049
104.71	125.34	2.3688
100.02	55.600	3.6892
96.506	12.721	0.26208
96.008	10.171	0.30239
103.56	112.72	1.9555
107.77	206.65	7.1869
110.62	259.43	6.8240
113.67	307.64	8.2352
115.69	323.13	9.3037
117.72	336.24	11.924
119.24	364.76	14.848

32S+110Pd

Please notice that the beam energy accuracy is 1/800

Quoted errors are only statistical; the absolute cross section scale is estimated to be accurate within +- 15%

Detected particles: evaporation residues

Target: 80 mug/cm², enriched to 98.79%, on carbon 20 mug/cm²

Data obtained at the XTU Tandem accelerator of INFN - Laboratori Naz. di Legnaro
A.M.Stefanini, D.Ackermann, L. Corradi, Phys. Rev. C52, R1727 (1995)

Ecm(MeV) sigma(mb) error(mb)

79.210	0.062000	0.0090000
80.140	0.23900	0.0090000
81.070	0.58500	0.017000
81.530	0.83900	0.022000
82.000	1.4580	0.033000
82.460	2.3150	0.044000
82.930	2.8850	0.048000
83.400	4.1050	0.070000
83.860	6.7780	0.075000
84.330	9.0730	0.15700
84.790	11.486	0.17300
85.260	15.850	0.24800
85.720	17.940	0.25000
86.190	22.493	0.41300
86.660	27.506	0.36100
87.120	33.617	0.48500
87.590	38.382	0.56800

88.050	43.266	0.58000
88.520	50.781	0.39800
88.980	61.283	0.54800
89.450	72.203	0.77300
89.910	80.591	0.77800
90.380	88.711	0.91500
90.850	102.13	1.2130
91.320	108.87	1.3570
91.780	120.91	1.3320
92.250	128.77	1.6830
92.710	140.60	1.9440
95.040	181.74	2.3130
97.370	256.62	3.6410
99.700	318.78	5.1540

$^{36}\text{S}+^{110}\text{Pd}$

Please notice that the beam energy accuracy is 1/800

Quoted errors are only statistical; the absolute cross section scale is estimated to be accurate within $\pm 15\%$

Detected particles: evaporation residues

Target: 80 $\mu\text{g}/\text{cm}^2$, enriched to 98.79%, on carbon 20 $\mu\text{g}/\text{cm}^2$

Data obtained at the XTU Tandem accelerator of INFN - Laboratori Naz. di Legnaro
A.M.Stefanini, D.Ackermann, L. Corradi, Phys. Rev. C52, R1727 (1995)

Ecm(MeV) sigma(mb) error(mb)

79.730	0.021000	0.0040000
80.190	0.033000	0.0030000
80.640	0.075000	0.0050000
81.090	0.19100	0.0090000
81.540	0.33600	0.013000
82.000	0.60700	0.029000
82.450	1.2980	0.030000
82.910	2.4130	0.042000
83.360	3.7180	0.060000
83.810	5.0450	0.095000
84.260	8.1160	0.12100
84.720	11.388	0.14500
85.170	15.717	0.21100
85.620	20.375	0.26800
86.070	26.278	0.34800
86.520	31.658	0.50500
86.980	35.977	0.53800
87.430	43.541	0.57800

87.890	54.058	0.64300
88.340	59.176	0.61400
88.790	72.794	0.80800
89.240	83.263	1.0330
89.700	90.334	0.98900
90.150	103.24	1.1000
90.600	111.67	1.5230
91.060	120.20	1.6610
91.510	132.59	1.7750
91.960	145.43	1.8330
92.420	156.43	2.0690
92.870	161.15	2.3650
93.320	172.73	2.3610
93.770	193.60	3.3340
94.680	206.38	3.2660
95.590	225.72	2.9460
96.490	252.30	3.8400
97.400	279.24	4.3000
98.300	288.56	4.1820
99.210	311.08	4.4270
100.12	337.32	7.8360
101.02	346.14	6.6790
101.92	360.65	4.5620
102.83	388.00	4.7500

$^{16}\text{O} + ^{112}\text{Cd}$

Please notice that the beam energy accuracy is 1/800

Detected particles: evaporation residues

Target: sandwich of gold 100 mug/cm² - ^{112}Cd 150 mug/cm², enriched to 97.05% - carbon 10 mug/cm²

Data obtained at the XTU Tandem accelerator of INFN - Laboratori Naz. di Legnaro
D.Ackermann, L.Corradi, D.R.Napoli et al., Nucl. Phys. A575, 374 (1994)

Ecm(MeV) sigma(mb) error(mb)

45.3	1.8	0.41
45.7	4.2	0.86
46.1	5.4	1.12
46.6	9.4	2.0
47.1	20.6	4.1
47.8	48.0	9.6
48.8	73.2	14.7
49.6	124.	25.
50.5	153.	31.
51.4	206.	41.
52.2	267.	54.

52.7	385.	77.
55.0	355.	71.
56.6	628.	126.
60.1	853.	171.

Here quoted errors include both statistical and systematic errors on the absolute cross section scale.

Detected particles are evaporation residues as usual.

Targets were metallic, self supporting foils,
235mg/cm² (99.8%), 330 mg/cm² (97.8%) and 265mg/cm² (96.5%) for
58,62,64Ni, respectively.

The reference is

A.M.Stefanini, G.Fortuna, R.Pengo et al., Nucl. Phys. A456, 509 (1986)
28Si+58Ni

Ecm(MeV) sigma(mb) error(mb)

49.200	0.053000	0.016000
49.600	0.085000	0.026000
51.100	1.9600	0.56000
51.700	9.7600	2.9300
52.000	7.9000	1.9800
53.600	35.800	9.7000
53.900	44.000	10.100
54.900	76.700	19.200
55.000	62.200	14.900
56.100	108.00	24.000
56.400	123.00	27.000
58.000	175.00	38.000
59.400	225.00	45.000
60.000	226.00	50.000
61.500	341.00	68.000
62.100	434.00	95.000

28Si+62Ni

Ecm(MeV) sigma(mb) error(mb)

48.400	0.11300	0.034000
48.700	0.39000	0.12000
49.800	2.7900	0.81000
50.900	11.000	3.0000
51.800	26.300	6.6000
54.400	107.00	24.000
57.300	212.00	43.000

28Si+64Ni

Ecm(MeV) sigma(mb) error(mb)

47.300	0.041000	0.012000
48.200	0.42400	0.12800
49.200	3.7800	1.0200
49.600	7.1500	1.9300
50.600	20.800	5.2000
50.900	24.400	5.6000
52.400	64.200	14.800
53.300	85.900	18.900
55.300	151.00	32.000
56.600	188.00	38.000
58.000	250.00	53.000
61.200	364.00	73.000
63.400	526.00	105.00

30Si+58Ni

Ecm(MeV) sigma(mb) error(mb)

48.400	0.067000	0.022000
49.000	0.20200	0.063000
49.700	0.59100	0.18300
51.100	7.1400	1.9300
52.200	15.500	4.2000
53.800	55.300	13.800
55.100	115.00	25.000
56.700	161.00	32.000
58.700	267.00	54.000
61.300	304.00	61.000

30Si+62Ni

Ecm(MeV) sigma(mb) error(mb)

47.400	0.067000	0.021000
48.100	0.12300	0.037000
49.400	1.2600	0.35000
50.700	9.9500	2.6900
52.000	39.900	9.6000
53.200	99.100	21.800
54.700	137.00	29.000
56.100	197.00	39.000
57.800	294.00	59.000
59.800	417.00	83.000
62.400	449.00	90.000

30Si+64Ni

Ecm(MeV) sigma(mb) error(mb)

47.300	0.047000	0.015000
48.700	0.69500	0.20900
49.400	2.8400	0.82000
50.000	8.1600	2.1200
51.200	28.700	7.2000
52.500	75.200	16.500
53.800	144.00	30.000
55.400	193.00	39.000
56.800	278.00	56.000
58.500	343.00	69.000
60.600	513.00	103.00
63.200	497.00	99.000

32S+58Ni

Ecm(MeV) sigma(mb) error(mb)

55.870	0.057000	0.018000
56.120	0.097000	0.030000
56.820	0.28600	0.090000
57.160	0.78200	0.20000
57.750	2.3600	0.60000
58.860	12.520	3.1000
59.840	25.800	6.5000
61.260	63.200	15.700
62.470	85.730	21.000
63.740	134.50	33.000
65.030	208.40	52.000
66.310	269.40	67.000
68.850	280.60	70.000
71.420	377.58	94.000
74.000	442.90	110.00
76.570	520.60	130.00
83.020	550.38	137.00
86.880	685.42	171.00
97.200	771.80	193.00

32S+64Ni

Ecm(MeV) sigma(mb) error(mb)

52.740	0.046000	0.016000
53.000	0.059000	0.020000
53.340	0.099000	0.030000
53.660	0.19900	0.066000
54.000	0.23200	0.067000
54.340	0.64000	0.17000
54.680	1.1300	0.29000
54.990	1.7800	0.45000
55.600	3.8600	0.97000
56.210	9.1200	2.3000
56.810	16.380	4.8000
57.430	28.290	7.5000
57.650	32.540	8.3000
58.000	34.460	7.0000
58.640	52.600	13.000
59.250	64.080	13.000
60.550	101.80	22.000
61.680	140.50	30.000
63.180	186.90	38.000
64.460	203.80	41.000
65.830	290.10	58.000
67.150	353.70	71.000
68.440	362.90	72.000
71.110	457.70	92.000
73.770	506.90	100.00
76.430	588.30	120.00
79.100	598.50	120.00
85.770	602.20	120.00
89.760	698.50	140.00
100.43	750.70	152.00

$^{34}\text{S}+^{58}\text{Ni}$

Ecm(MeV) sigma(mb) error(mb)

55.760	0.22400	0.070000
56.070	0.43500	0.13000
56.380	0.64400	0.19000
57.010	2.0500	0.50000
57.630	5.5600	1.4000
58.790	20.000	5.0000
59.960	50.000	12.500
61.120	76.400	16.800
62.350	114.00	23.000
63.600	148.20	30.000
64.840	171.80	34.400
66.110	211.40	42.000
68.600	230.80	46.000

71.750 388.50 78.000

$^{34}\text{S}+^{64}\text{Ni}$

Ecm(MeV) sigma(mb) error(mb)

53.870	0.15000	0.045000
54.520	0.58000	0.17000
55.180	2.4900	0.62000
55.790	5.8400	1.4600
56.960	22.600	4.5000
57.550	34.500	8.7000
58.170	55.900	12.300
58.770	79.000	17.400
59.360	98.400	21.600
60.570	127.90	25.600
61.890	202.70	40.500
63.160	231.20	46.200
64.460	277.60	55.500
65.760	324.60	65.000
67.080	384.10	77.000
68.340	362.90	72.500
70.950	398.20	79.600
74.210	645.90	129.00

$^{36}\text{S}+^{58}\text{Ni}$

Ecm(MeV) sigma(mb) error(mb)

53.950	0.037000	0.011000
54.260	0.060000	0.020000
54.550	0.11000	0.033000
55.130	0.31300	0.094000
55.430	0.45000	0.15000
55.770	0.99000	0.33000
56.380	2.1400	0.53000
56.970	5.0400	1.2600
57.550	8.9600	2.2400
58.700	26.200	6.5000
59.870	52.100	13.000
61.080	101.00	20.200
61.330	95.900	21.000
63.470	155.90	31.200
65.930	213.70	42.700
68.390	259.60	51.900
70.830	318.70	63.700
73.280	371.80	74.400

85.730 503.60 100.70

$^{36}\text{S}+^{64}\text{Ni}$

Ecm(MeV) sigma(mb) error(mb)

53.460	0.033000	0.0100000
53.650	0.069000	0.021000
53.780	0.088000	0.026000
54.090	0.16000	0.050000
54.410	0.31000	0.093000
54.700	0.58000	0.17000
55.970	7.0700	1.7700
56.270	10.590	2.6500
56.570	15.610	3.9000
57.440	39.400	9.8000
57.700	44.600	9.8000
58.240	60.600	13.300
58.800	72.100	15.900
59.400	96.600	20.300
60.670	149.60	30.000
61.910	195.10	39.000
63.190	290.70	58.100
63.450	264.80	53.000
65.710	343.20	68.600
68.270	412.60	82.500
70.820	455.70	91.100
73.370	522.40	104.00
75.910	609.30	122.00
82.350	705.00	141.00
88.860	611.20	122.20

$^{64}\text{Ni}+^{92,96}\text{Zr}$

Here quoted errors include both statistical AND systematic errors on the absolute cross section scale.

Detected particles are evaporation residues as usual.

Targets were metallic zirconium, evaporated on 20mug/cm² carbon layers, with thicknesses (enrichments)

165mug/cm² (94.57%) and 50 mug/cm² (95.63%) for ^{92}Zr and ^{96}Zr , respectively.

The reference is

A.M.Stefanini, L.Corradi, D.Ackermann et al., Nucl. Phys. A548, 453 (1992)

$^{64}\text{Ni} + ^{92}\text{Zr}$ (only evaporation residues !)

Ecm(MeV) sigma(mb) error(mb)

122.15	0.028000	0.014000
124.51	0.22200	0.043000
126.76	1.2400	0.24000
129.35	5.5800	1.0000
132.28	20.900	3.7000
134.59	41.200	7.2000
137.20	74.000	12.900
138.95	100.50	8.5000
142.04	136.40	19.100
145.41	165.70	28.300
149.50	214.10	26.500
153.63	226.00	39.000
157.75	248.30	42.800

NB: complementary fusion-fission x-sects. were measured by F.L.H.Wolfs et al.,
Phys. Rev. C39, 865 (1989)

$^{64}\text{Ni} + ^{96}\text{Zr}$ (only evaporation residues !)

Ecm(MeV) sigma(mb) error(mb)

121.58	0.26100	0.040000
123.96	2.4400	0.31000
126.36	8.3100	1.5200
128.75	19.300	3.5000
131.45	44.300	8.1000
134.44	83.200	14.800
136.84	122.10	21.300
139.54	166.10	29.200
141.33	176.20	23.500
144.51	185.70	21.600
147.93	187.10	32.000
152.13	215.20	26.500
156.33	250.30	44.200
160.53	270.60	47.500

$^{58}\text{Ni} + ^{90,91,94}\text{Zr}$

Here quoted errors include statistical errors only.

Detected particles are evaporation residues as usual.

Targets were ZrO_2 evaporated on 20 $\mu\text{g}/\text{cm}^2$ carbon layers,
with thicknesses ranging from 60 to 120 $\mu\text{g}/\text{cm}^2$ and enrichments
97.65%, 94.59% and 91.2% for ^{90}Zr , ^{91}Zr and ^{94}Zr , respectively.

The reference is

F.Scarlassara, S.Beghini, F.Soramel et al., Z.Phys. A338, 171 (1991)

$^{58}\text{Ni} + ^{90}\text{Zr}$ (only evaporation residues !)

Ecm(MeV) sigma(mb) error(mb)

127.30	0.34500	0.12200
127.90	0.55000	0.14300
129.10	1.8610	0.34600
129.70	2.6740	0.45500
130.70	5.2530	0.85600
132.00	10.069	1.2330
133.40	16.484	2.8450
136.40	39.959	6.4500
139.50	79.323	11.984
142.50	115.21	17.606
145.60	126.39	17.976
151.60	178.07	22.098
157.70	154.90	16.400
163.80	136.10	11.600
169.90	117.40	6.4000

$^{58}\text{Ni} + ^{91}\text{Zr}$ (only evaporation residues !)

Ecm(MeV) sigma(mb) error(mb)

126.40	0.25000	0.084000
127.00	0.81100	0.20200
127.30	0.90500	0.24000
127.60	1.0500	0.22000
128.90	2.4500	0.43000
129.10	2.9800	0.50000
130.10	6.1900	0.96000
130.30	8.7800	1.4600
131.60	13.200	2.0000
132.80	20.100	3.1000
134.00	30.200	4.8000
137.40	59.500	6.0000
140.30	115.70	16.800
146.20	151.00	21.600
143.30	137.00	20.400
152.30	183.10	23.300
158.40	163.00	14.400
164.50	141.80	13.400
170.60	138.20	9.6000

58Ni + 94Zr (only evaporation residues !)

Ecm(MeV) sigma(mb) error(mb)

122.70	0.34600	0.091000
123.30	0.56700	0.14000
123.90	0.66000	0.17400
124.80	1.2000	0.21000
126.40	2.9500	0.55000
127.00	4.1400	0.71000
128.20	6.6400	1.2500
129.20	12.000	1.9000
130.10	19.100	3.1000
130.70	20.200	3.5000
131.30	26.500	4.2000
132.90	36.000	5.5000
133.80	49.800	7.6000
135.70	59.400	9.1000
138.70	85.000	14.500
141.80	161.20	24.000
144.90	189.60	28.800
148.00	186.30	27.500
154.20	194.40	27.000
160.40	169.60	19.200
166.60	148.10	18.800
172.80	133.90	15.900

35,37Cl+58,62,64Ni

Here errors are not reported. Systematic errors on the absolute cross section scale are +-15%.

Detected particles are evaporation residues.

Targets were metallic self-supporting nickel foils

with thicknesses 250-300 mug/cm2 and enrichments between 96.5% for 64Ni and 99.8% for 58Ni.

S.J.Skorka, A.M.Stefanini, G.Fortuna, et al., Z.Phys A 328 (1987) 355

35+58

Ecm(MeV) sigma(mb) error(mb)

59.13000	0.1171000	0.0000000E+00
59.57000	0.3280000	0.0000000E+00
60.49000	0.9390000	0.0000000E+00
60.82000	3.631000	0.0000000E+00
61.15000	5.692000	0.0000000E+00
63.66000	43.25900	0.0000000E+00
63.66000	43.05000	0.0000000E+00

66.01000	106.8530	0.0000000E+00
67.80000	165.6400	0.0000000E+00

35+64

Ecm(MeV) sigma(mb) error(mb)

56.50000	0.1570000	0.0000000E+00
57.15000	0.3820000	0.0000000E+00
57.79000	0.9040000	0.0000000E+00
58.44000	2.698000	0.0000000E+00
58.92000	5.759000	0.0000000E+00
59.57000	10.62200	0.0000000E+00
60.70000	20.12900	0.0000000E+00
61.37000	34.56000	0.0000000E+00
62.02000	57.06800	0.0000000E+00
62.57000	76.91200	0.0000000E+00
63.13000	87.28800	0.0000000E+00
65.72000	192.0400	0.0000000E+00
65.72000	175.3540	0.0000000E+00
70.21000	363.1000	0.0000000E+00

37+58

Ecm(MeV) sigma(mb) error(mb)

58.11000	0.1406000	0.0000000E+00
58.42000	0.2150000	0.0000000E+00
58.74000	0.4580000	0.0000000E+00
59.35000	1.009000	0.0000000E+00
59.97000	2.616000	0.0000000E+00
60.45000	5.390000	0.0000000E+00
61.92000	23.22500	0.0000000E+00
63.14000	45.70500	0.0000000E+00
63.14000	45.38000	0.0000000E+00
64.98000	105.1420	0.0000000E+00
66.77000	138.3200	0.0000000E+00

37+62

Ecm(MeV) sigma(mb) error(mb)

59.05000	2.527000	0.0000000E+00
59.35000	6.285000	0.0000000E+00
59.95000	10.16400	0.0000000E+00
61.24000	31.60200	0.0000000E+00
61.57000	43.81400	0.0000000E+00
64.43000	126.3010	0.0000000E+00
66.31000	229.1780	0.0000000E+00

37+64

Ecm(MeV) sigma(mb) error(mb)

57.31000	0.5150000	0.0000000E+00
57.70000	0.8690000	0.0000000E+00
59.59000	13.00700	0.0000000E+00
60.22000	25.28500	0.0000000E+00
60.22000	24.26000	0.0000000E+00
60.60000	30.48700	0.0000000E+00
61.24000	60.21900	0.0000000E+00
61.60000	72.91800	0.0000000E+00
62.18000	82.11100	0.0000000E+00
63.78000	153.6150	0.0000000E+00
65.23000	192.2300	0.0000000E+00
65.23000	192.7020	0.0000000E+00
67.15000	301.3640	0.0000000E+00
69.05000	334.7800	0.0000000E+00
