Date: Dec 2013 - Jan 2019

Available Experimental (recommended or individual) Spectrum Averaged Cross Sections (SPA) in Cf-252(s.f.) field
sorted by E(50%)

N	Reaction Name			E(50%)	SPA	SPA Uncertainty		Reference to	Ref. to Original Experiment	
N	Z	full	short	MeV	mb	%	mb	Recommended data	Author	EXFOR
1	21	Sc-45(n,γ)Sc-46	sc45g	0.568	NOT measured yet					
2	3	Li-6(n,t)He-4	li6t	0.662	NOT measured yet					
3	41	Nb-93(n,γ)Nb-94	nb93g	0.678	NOT measured yet					
1	79	Au-197(n,γ)Au-198	au197g	0.725	7.679E+01	1.59	1.221E+00	W. Mannhart 2002		
					7.550E+01	0.13	1.000E-01	S. Manojlovic 2011		
4	26	Fe-58(n,γ)Fe-59	fe58g	0.734	NOT measured yet					
5	47	Ag-109(n,γ)Ag-110m	ag109g	0.735	NOT measured yet					
6	92	U-235(n,γ)U-236	u235g	0.736	NOT measured yet					
2	25	Mn-55(n,γ)Mn-56	mn55g	0.751	2.960E+00	7.09	2.100E-01		J.Csikai*	30400.024
3	73	Ta-181(n,γ)Ta-182	ta181g	0.819	8.730E+01	1.37	1.200E+00	S. Manojlovic 2011		
7	5	B-10(n,a)Li-7	b10a	0.903	NOT measured yet					
4	27	Co-59(n,γ)Co-60	co59g	0.904	6.970E+00	4.88	3.400E-01		J.Csikai*	30400.026
5	90	Th-232(n,γ)Th-233	th232g	0.911	8.700E+01	1.84	1.600E+00	S. Manojlovic 2011		10557.003
8	92	U-238(n,γ)U-239	u238g	0.920	NOT measured yet					
6	11	Na-23(n,γ)Na-24	na23g	0.963	3.350E-01	4.48	1.500E-02		J.Csikai*	30400.016
7	29	Cu-63(n,γ)Cu-64	cu63g	0.965	1.044E+01	3.24	3.383E-01	W. Mannhart 2002		
					1.030E+01	2.91	3.000E-01	S. Manojlovic 2011		
8	49	In-115(n,γ)In-116m	in115g	1.013	1.230E+02	2.10	2.580E+00	K.Zolotarev, INDC(NDS)-0657		
					1.256E+02	2.23	2.801E+00	W. Mannhart 2002	Mannhart's 1.256E+1 is a typo ?	
9	74	W-186(n,γ)	w186g	1.024	NOT measured yet					
10	49	In-113(n,γ)In-114m	in114g	1.144	NOT measured yet					
9	92	U-235(n,f)	u235f	1.700	1.210E+03	1.20	1.452E+01	W. Mannhart 2008		
10	94	Pu-239(n,f)	pu239f	1.780	1.812E+03	1.37	2.482E+01	W. Mannhart 2008		
11	93	Np-237(n,f)	np237f	2.080	1.361E+03	1.59	2.164E+01	W. Mannhart 2008		
11	95	Am-241(n,f)	am241f	2.228	NOT measured yet					
12	45	Rh-103(n,n')Rh-103m	rh103n	2.380	7.390E+02	2.98	2.200E+01		G.Lamaze	13142.002
					7.570E+02	7.00	5.300E+01		A.Pazsit	30266.004
					6.470E+02	10.82	7.000E+01		G.Kirouac	10985.007
13	49	In-115(n,n')In-115m	in115n	2.680	1.974E+02	1.37	2.704E+00	W. Mannhart 2008		
14	41	Nb-93(n,n')Nb-93m	nb93n	2.686	1.475E+02	1.69	2.500E+00	K.Zolotarev, INDC(NDS)-0193		
15	49	In-113(n,n')In-113m	in113m	2.731	1.612E+02	2.04	3.290E+00	K.Zolotarev, INDC(NDS)-0657		
16	92	U-238(n,f)	u238f	2.780	3.257E+02	1.64	5.341E+00	W. Mannhart 2008		
17	90	Th-232(n,f)	th232f	3.005	8.470E+01	5.79	4.900E+00		J.Csikai by fission chamber	30415.004
					8.900E+01	10.11	9.000E+00		M.Buczko by track detector	31731.008
					8.940E+01	3.02	2.700E+00		J. Grundl by fission chamber	12821.002
					7.460E+01	4.96	3.700E+00		J. Deen by track detector	13334.004
18	80	Hg-199(n,n')Hg-199m	hg199n	3.100	2.984E+02	1.81	5.401E+00	W. Mannhart 2002		
19	22	Ti-47(n,p)Sc-47	ti47p	3.850	1.927E+01	1.66	3.199E-01	W. Mannhart 2008		
12	15	P-31(n,p)Si-31	p31p	3.969	NOT measured yet					
20	16	S-32(n,p)P-32	s32p	4.080	7.254E+01	3.49	2.532E+00	W. Mannhart 2008		
21	28	Ni-58(n,p)Co-58	ni58p	4.130	1.175E+02	1.30	1.528E+00	W. Mannhart 2008		
22	30	Zn-64(n,p)Cu-64	zn64p	4.160	4.059E+01	1.65	6.697E-01	W. Mannhart 2008		
23	26	Fe-54(n,p)Mn-54	fe54p	4.280	8.684E+01	1.34	1.164E+00	W. Mannhart 2008		
					8.662E+01	1.35	1.170E+00	K.Zolotarev, INDC(NDS)-0657		
					7.872E+01	3.90	3.070E+00		M.Schulz	31786.009
13	30	Zn-67(n,p)Cu-67	zn67p	4.709	NOT measured yet					
24	82	Pb-204(n,n')Pb-204m	pb204n	5.042	2.090E+01	5.75	1.202E+00		J.Csikai	30400.053
					2.085E+01	4.41	9.200E-01		K.Kobayashi	21950.006
25	42	Mo-92(n,p)Nb-92m	mo92p	5.392	1.517E+01	4.40	6.670E-01	K.Zolotarev, INDC(NDS)-0657	J.Csikai	30400.035
26	27	Co-59(n,p)Fe-59	co59p	5.760	1.690E+00	2.48	4.191E-02	W. Mannhart 2008		
					1.816E+00	3.50	6.356E-02		M.Schulz 2019	
27	13	Al-27(n,p)Mg-27	al27p	5.960	4.880E+00	2.14	1.044E-01	W. Mannhart 2008		
					4.976E+00	3.50	1.742E-01		M.Schulz 2018	31786.008
28	22	Ti-46(n,p)Sc-46	ti46p	6.010	1.407E+01	1.77	2.490E-01	W. Mannhart 2008		
29	23	V-51(n,p)Ti-51	v51p	6.440	6.488E-01	1.97	1.278E-02	W. Mannhart 2008		
30	28	Ni-60(n,p)Co-60	ni60p	6.817	2.390E+00	5.44	1.300E-01	W. Mannhart 1987	W.Mannhart NUREG/CP-0029(1982)637	21817.017
31	29	Cu-63(n,a)Co-60	cu63a	7.019	6.887E-01	1.96	1.350E-02	W. Mannhart 2008		
32	14	Si-28(n,p)	si28p	7.226	6.900E+00	1.96	4.370E-01	K.Zolotarev 2014	Z.Dezso	30641.003
14	26	Fe-54(n,a)Cr-51	fe54a	7.430	NOT measured yet		(see also)			
32	26	Fe-56(n,p)Mn-56	fe56p	7.540	1.465E+00	1.77	2.593E-02	W. Mannhart 2008		
33	12	Mg-24(n,p)Na-24	mg24p	8.250	1.996E+00	2.44	4.870E-02	W. Mannhart 2008		
34	92	U-238(n,2n)	u2382	8.276	**1.920E+01**	**9.90**	**1.900E+00**		M.Blinov	40996.002
					1.220E+01	12.30	1.500E+00		G.Shani	30658.004
35	27	Co-59(n,a)Mn-56	co59a	8.350	2.218E-01	1.88	4.170E-03	W. Mannhart 2008		
36	22	Ti-48(n,p)Sc-48	ti48p	8.390	4.247E-01	1.89	8.027E-03	W. Mannhart 2008		
37	13	Al-27(n,a)Na-24	al27a	8.640	1.016E+00	1.47	1.494E-02	W. Mannhart 2008		
					9.851E-01	3.50	3.448E-02		M.Schulz 2018	31786.007
38	23	V-51(n,a)Sc-48	v51a	9.960	3.900E-02	2.21	8.619E-04	W. Mannhart 2008		
39	69	Tm-169(n,2n)Tm-168	tm1692	10.401	6.690E+00	6.28	4.201E-01	W. Mannhart 2002		
					6.358E+00	4.20	2.670E-01		M.Schulz 2019	
40	79	Au-197(n,2n)Au-196	au1972	10.630	5.506E+00	1.83	1.008E-01	W. Mannhart 2008		
					5.474E+00	3.50	1.916E-01		M.Schulz 2019	
41	41	Nb-93(n,2n)Nb-92m	nb932	11.360	7.490E-01	5.07	3.797E-02	W. Mannhart 2008		
					8.248E-01	3.90	3.217E-02		M.Schulz 2019	

N	Reaction Name			E(50%)	SPA	SPA Uncertainty		Reference to	Ref. to Original Experiment		
N	Z	full	short	MeV	mb	%	mb	Recommended data	Author	EXFOR	
42	53	I-127(n,2n)I-126	i1272	11.750	2.069E+00	2.73	5.648E-02	W. Mannhart 2008			
					2.044E+00	3.52	7.200E-02		M.Schulz 2018_2		
15	49	In-115(n,2n)In-114m	in1152	11.808	NOT measured yet		(see also)				
16	59	Pr-141(n,2n)Pr-140	pr1412	11.846	NOT measured yet		(see also)				
43	29	Cu-65(n,2n)Cu-64	cu652	12.459	6.582E-01	2.22	1.461E-02	W. Mannhart 2008			
44	25	Mn-55(n,2n)Mn-54	mn552	12.850	4.075E-01	2.33	9.495E-03	W. Mannhart 2008			
					4.821E-01	4.00	1.928E-02		M.Schulz 2019		
17	33	As-75(n,2n)As-74	as752	12.913	NOT measured yet		(see also)				
45	27	Co-59(n,2n)Co-58	co592	13.088	4.051E-01	2.51	1.017E-02	W. Mannhart 2008			
					4.199E-01	3.50	1.470E-02		M.Schulz 2019		
46	29	Cu-63(n,2n)Cu-62	cu632	13.599	1.844E-01	3.98	7.339E-03	W. Mannhart 2008			
47	39	Y-89(n,2n)Y-88	y892	13.896	3.409E-01	3.60	1.227E-02		M.Schulz 2018	31786.004	(see also)
					3.506E-01	**3.70**	**1.297E-02**		M.Schulz 2019		
48	9	F-19(n,2n)F-18	f192	14.000	1.612E-02	3.37	5.432E-04	W. Mannhart 2008			
					1.561E-02	3.80	5.932E-04		M.Schulz 2018	31786.006	
49	40	Zr-90(n,2n)Zr-89	zr902	14.400	2.210E-01	2.89	6.387E-03	W. Mannhart 2008			
					2.162E-01	3.50	7.567E-03		M.Schulz 2018	31786.003	
18	24	Cr-52(n,2n)Cr-51	cr522	14.705	NOT measured yet		(see also)				
50	28	Ni-58(n,2n)Ni-57	ni582	14.722	8.952E-03	3.57	3.196E-04	W. Mannhart 2008	W.Mannhart	21817.009	
					8.558E-03	3.62	3.100E-04	K.Zolotarev, INDC(NDS)-0657			
19	22	Ti-47(n,np)Sc-46	ti47np	14.931	NOT measured yet						
51	11	Na-23(n,2n)Na-22	na232	15.403	8.700E-02	3.60	3.132E-03		M.Schulz 2018	31786.002	(see also)
					8.980E-03	3.56	3.200E-04		M.Schulz 2018_2		
20	22	Ti-49(n,np)Sc-48	ti49np	15.884	NOT measured yet						
52	22	Ti-46(n,2n)Ti-45	ti462	16.026	9.300E-02	33.33	3.100E-02		J.Csikai	30400.017	
21	22	Ti-48(n,np)Sc-47	ti48np	18.884	NOT measured yet						
22	26	Fe-54(n,2n)Fe-53	fe542	16.484	NOT measured yet		(see also)				
23	83	Bi-209(n,3n)Bi-207	bi2093	17.779	NOT measured yet		(see also)				
24	69	Tm-169(n,3n)Tm-167	tm1693	18.055	NOT measured yet		(see also)				
25	27	Co-59(n,3n)Co-57	co593	19.831	NOT measured yet		(see also)				
52		**Number of measured**									
25		**Number of not measured**									
77		**Total**									

References

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K. Zolotarev 2014	INDC(NDS)-0668, Oct 2014	28Si(n,p)28Al, 31P(n,p)31Si, and 113In(n,γ)114mIn
K. Zolotarev 2013	INDC(NDS)-0657, Dec 2013	54Fe(n,p), 58Ni(n,2n), 67Zn(n,p), 92Mo(n,p), 93Nb(n,γ), 113In(n,n'), 115In(n,γ), 169Tm(n,3n)
K. Zolotarev 2010	INDC(NDS)-0584, Nov 2010	59Co(n,3n), 89Y(n,2n), 93Nb(n,2n), 169Tm(n,2n) and 209Bi(n,3n)
K. Zolotarev 2009	INDC(NDS)-0546, Apr 2009	27Al(n,α), 55Mn(n,2n), 59Co(n,p), 59Co(n,2n) and 90Zr(n,2n)
K. Zolotarev 2008	INDC(NDS)-0526, Aug 2008	24Mg(n,p), 32S(n,p), 60Ni(n,p), 63Cu(n,2n),65Cu(n,2n), 64Zn(n,p), 115In(n,2n), 127I(n,2n),197Au(n,2n), 199Hg(r
K. Zolotarev 2004	INDC(CCP)-0438, Feb 2004	27Al(n,p), 56Fe(n,p) and 237Np(n,f)
K. Zolotarev 2002	INDC(CCP)-0431, Aug 2002	139La(n,γ), 186W(n,γ) and 204Pb(n,n')
K. Zolotarev 1999	INDC(NDS)-0193, Mar 1999	RRDF-98
S. Manojlović 2011	NENE-20, 307, Bovec 2011	http://www.nss.si/nene2011/htm/abs/absNENE20112903.html
M. Schulz 2018	App Rad Isot **132**(2018)29	
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Comments

difference << sum of uncertainties
difference < sum of uncertainties
difference > sum of uncertainties
only one experiment

* - (n,γ) measured by Buczko and Csikai in 1976-1978 could be poluted by room scattered neutrons (see S. Manojlovi ć, A. Trkov, NENE-20)

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