^{77}Se(α,2npγ),^{76}Ge(^{7}Li,5nγ) 1982Be03,1980Ga11

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ameenah R. Farhan, Balraj Singh	NDS 110, 1917 (2009)	30-Jun-2009

Additional information 1.

1982Be03, 1980Ga11: ^{77}Se(α,2npγ) E=30-55 MeV; ^{76}Ge(^{7}Li,5nγ) E=40-55 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, level lifetimes by γ(t) using Ge(Li) detectors. The (α,2npγ) experiment was done at Buenos Aires and (^{7}Li,5nγ) at Grenoble. The 1980Ga11 work reported earlier results from (α,2npγ) experiment.

All data are from 1982Be03 unless otherwise stated.

See also " ^{76}Se(α,npγ),^{78}Se(p,nγ),^{78}Se(d,2nγ) " dataset.

^{78}Br Levels

E(level)	J$^{\pi}$‡	T$_{1/2}$†	Comments
0.0	1$^+$		
32.3 *2*	(2$^-$)		
180.8 *3*	(4$^+$)	120 μs *1*	
196.1? *3*	(1,2,3)$^{(+)}$	<25 ns	E(level): level not included In 'Adopted Levels', the 196.0γ most likely deexcites a 423 level.
227.6 *4*	(5$^+$)	84 ns *8*	
242.6 *4*	(3,4)$^-$	17 ns *2*	
264.8 *5*	(5$^-$)		
337.8 *4*	(6$^+$)	9.0 ns *10*	
423.6? *5*		<25 ns	level proposed by the evaluators based on (^{11}B,3nγ) results, reassigning 196.0γ. T$_{1/2}$: from 196γ(t) (1982Be03).
437.6 *5*	(7$^+$)	<3 ns	
457.3 *6*	(1,2,3$^+$)		
467.6 *6*	(8$^+$)		
646.8 *7*	(4)		
976.9 *6*	(9$^+$)		
1371.6 *6*	(10$^+$)		
1940.1 *7*	(11$^+$)		

† From γ(t) (1982Be03,1980Ga11).

‡ From 'Adopted Levels'.

γ(^{78}Br)

E$_\gamma$†	I$_\gamma$†	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	α‡	Comments
30.0 *3*	15 *5*	467.6	(8$^+$)	437.6	(7$^+$)	(D)		A$_2$=+0.03 *6* Additional information 5.
32.3 *2*	62 *8*	32.3	(2$^-$)	0.0	1$^+$			A$_2$=0.00 *2*
37.4 *5*	7 *2*	264.8	(5$^-$)	227.6	(5$^+$)			A$_2$=+0.16 *11*
46.3 *5*	7 *2*	242.6	(3,4)$^-$	196.1?	(1,2,3)$^{(+)}$			E$_\gamma$,I$_\gamma$: see comments for 46.8γ from 227 level.
46.8 *2*	60 *5*	227.6	(5$^+$)	180.8	(4$^+$)	(M1+E2)	8 *7*	A$_2$=+0.09 *2* α(K)=6 *5*; α(L)=1.4 *13*; α(M)=0.22 *21*; α(N+..)=0.017 *16* α(N)=0.017 *16* Additional information 2. A$_2$ for 46.8+46.3 γ rays. E$_\gamma$,I$_\gamma$: doublet from $\gamma\gamma$ data, with most of the intensity deexciting the 228 level.

Continued on next page (footnotes at end of table)

^{77}Se(α,2npγ),^{76}Ge(^{7}Li,5nγ) 1982Be03,1980Ga11 (continued)

γ(^{78}Br) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
							Mult.: α(exp)>1.8 is deduced from an intensity balance at the 228 level (1980Ga11), requiring $\delta \geq 0.14$, if mult=D+Q. This is consistent with $\gamma(\theta)$. RUL then rules out E1+M2.
x63.3 5	5 1						
x68.8 5	3.0 15						
x71.9@ 5	3.0 6						
72.9 5	4.0 6	337.8	(6$^+$)	264.8	(5$^-$)	D	A_2=−0.4 2 Additional information 4.
83.9 5	4.0 5	264.8	(5$^-$)	180.8	(4$^+$)	D	A_2=−0.5 3 Additional information 3.
99.8 2	100 5	437.6	(7$^+$)	337.8	(6$^+$)	D	A_2=−0.18 2
110.2 2	110 10	337.8	(6$^+$)	227.6	(5$^+$)	D	A_2=−0.050 14
148.5 2	180 10	180.8	(4$^+$)	32.3	(2$^-$)		A_2=−0.01 2
196.0#@ 3	25 2	196.1?	(1,2,3)$^{(+)}$	0.0	1$^+$	(D)	A_2=−0.13 12 E_γ,I_γ: placement of this γ is treated As questionable. This γ is most likely a doublet with a major fraction deexciting a level At 423 keV as In (^{11}B,3nγ) (1996La13). A minor fraction May deexcite a 197 level known from (p,nγ).
196.0#@ 3	25 2	423.6?		227.6	(5$^+$)	(D)	E_γ: placement proposed by the evaluators based on (^{11}B,3nγ) results.
242.9 5	3 1	242.6	(3,4)$^-$	0.0	1$^+$		
261.2 5	9 2	457.3	(1,2,3$^+$)	196.1?	(1,2,3)$^{(+)}$		
394.5 3	16 3	1371.6	(10$^+$)	976.9	(9$^+$)		
404.2 5	9 2	646.8	(4)	242.6	(3,4)$^-$		
419.6@ 5	5 1	646.8	(4)	227.6	(5$^+$)		I_γ: estimated by 1982Be03 from branching ratio given by 1979Kl05.
457.2@ 5	4 1	457.3	(1,2,3$^+$)	0.0	1$^+$		
509.2 2	35 5	976.9	(9$^+$)	467.6	(8$^+$)		I_γ: from $\gamma\gamma$ data.
x564.2 5	6 3						
568.5 3	18 4	1940.1	(11$^+$)	1371.6	(10$^+$)	D	A_2=−0.30 18
904.1 2	38 4	1371.6	(10$^+$)	467.6	(8$^+$)	(Q)	A_2=+0.30 10

† Most data are from (α,2npγ). The intensities are most likely at E(α)=45 MeV. 1982Be03 state that intensities are about the same in the two reactions. The uncertainty in energy is stated by 1982Be03 as 0.2 keV for the strongest γ ray to 0.5 keV for the weakest one. The evaluators assign 0.2 keV for Iγ>30, 0.3 keV for Iγ=10-30 and 0.5 for Iγ<10.

‡ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

Multiply placed.

@ Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

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Level Scheme

Intensities: Relative I_γ

Legend

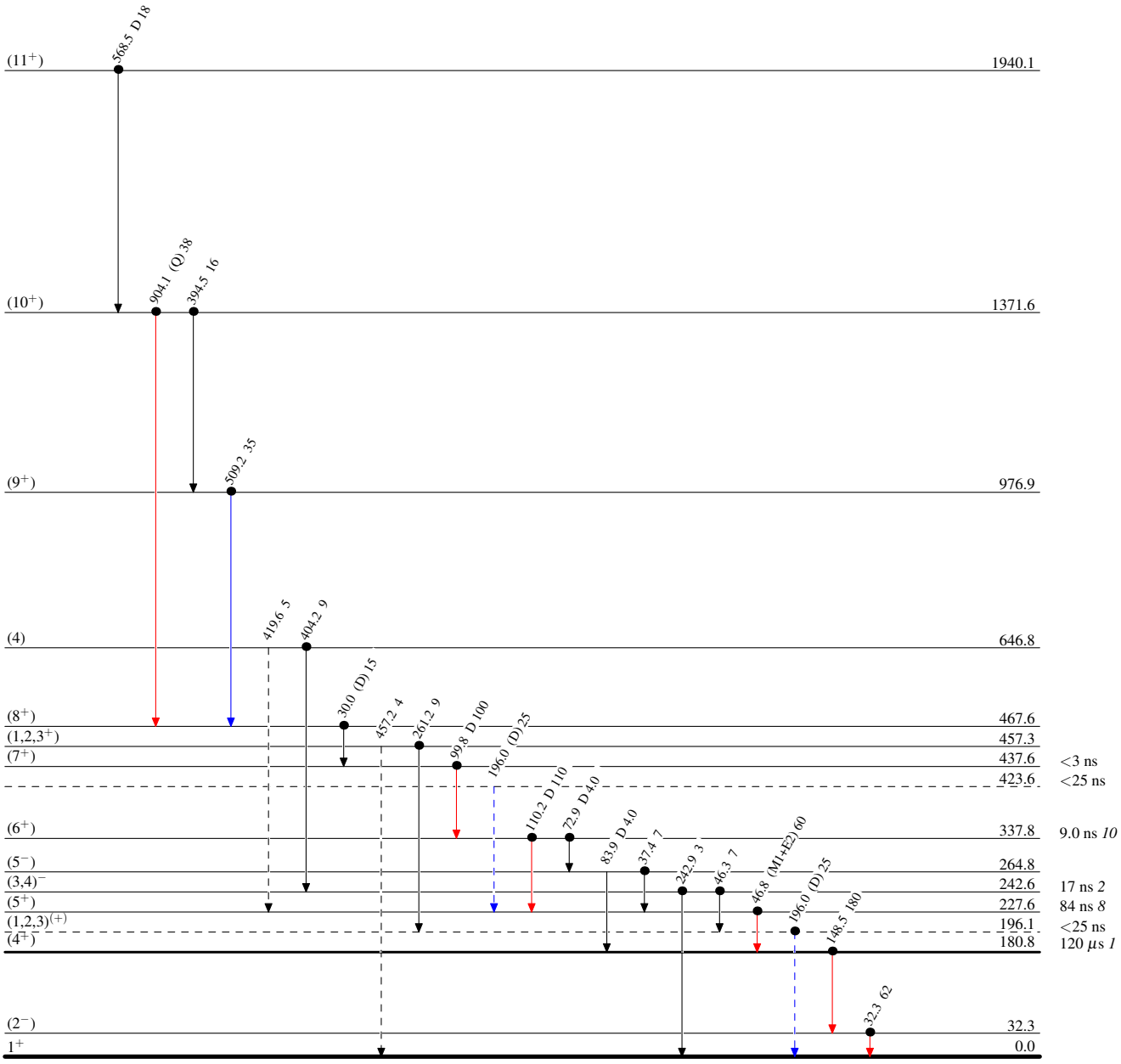
$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)

Coincidence



$^{78}_{35}Br_{43}$