^{77}As β^- decay (38.79 h) 1983Da24,1971Ar24

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	30-Sep-2020

Parent: ^{77}As: E=0.0; $J^\pi=3/2^-$; $T_{1/2}$=38.79 h *5*; Q(β^-)=683.2 *17*; %β^- decay=100.0

^{77}As-J^π,$T_{1/2}$: From ^{77}As Adopted Levels.

^{77}As-Q(β^-): From 2017Wa10.

1983Da24, 1971Ar24 (also 1968Ar09): measured Eγ, Iγ, $\gamma\gamma$-coin.

The decay scheme is based on $\gamma\gamma$ data of 1971Ar24.

Others:

1981Ni04: measured half-life of ^{77}As decay and deduced chemical effect on decay constant.

1979ChZQ: measured Eγ, Iγ, $\gamma\gamma$-coin.

1964Mu10: measured Eγ, Iγ, $\gamma\gamma$-coin.

1955Sc36: production of ^{77}As source in ^{81}Br(γ,α) reaction, and measurement of half-life.

1955Bi96: measured Eγ, Iγ.

1953Re12, 1953Sa46, 1951Ca04, 1951Je01: measured β^-, $\beta\gamma$-coin, Eγ, $\gamma\gamma$-coin:

Total decay energy of 683 keV *2* deduced (by RADLIST code) from proposed decay scheme is in perfect agreement with the expected value of 683 keV *2*, indicating that decay scheme is well established.

^{77}Se Levels

E(level)	J^π[†]	$T_{1/2}$[†]	Comments
0.0	$1/2^-$	stable	
161.942 *7*	$7/2^+$	17.36 s *5*	%IT=100
175.329 *24*	$9/2^+$		
239.012 *6*	$3/2^-$		
249.800 *6*	$5/2^-$		
301.169 *14*	$5/2^+$		
439.493 *12*	$5/2^-$		
520.653 *7*	$3/2^-$		

[†] From the Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(162.5 *17*)	520.653	0.63 *10*	5.8 *1*	av Eβ=44.5 *6*
(243.7 *17*)	439.493	0.0017 *3*	8.9 *1*	av Eβ=69.7 *6*
(382.0 *17*)	301.169	0.013 *2*	8.7 *1*	av Eβ=116.2 *7*
(433.4 *17*)	249.800	0.63 *10*	7.2 *1*	av Eβ=134.5 *7* (450β)(250γ) reported (1953Re12,1953Sa46).
(444.2 *17*)	239.012	1.6 *2*	6.8 *1*	av Eβ=138.3 *7*
(521.3 *17*)	161.942	0.092 *16*	8.4[1u] *1*	av Eβ=189.6 *7*
(683.2 *17*)	0.0	97.0 *3*	5.713 *5*	av Eβ=228.8 *7* Iβ^-: from absolute intensity of 239γ+250γ, and intensity balance at each level. E(decay): 684 *9* is the weighted average of the measured end-point energies: 700 keV *7* (1951Ca04) and 679 keV *4* (1951Je01).

[†] From %Iγ(239γ+250γ)=2.0 *3* and γ-ray intensity balance at each level.

[‡] Absolute intensity per 100 decays.

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$\gamma(^{77}Se)$

Iγ normalization: From %Iγ(239γ+250γ)=2.0 *3*, an average of 2.5 *5* (1955La14), 1.4 *4* (1953Re12), 2.3 *5* (1953Ra18), 1.7 *4* (1953Sa46). Uncertainties on values from 1953Ra18 and 1953Sa46 are estimated by the evaluator.
The 167γ and 177γ reported by 1979ChZQ only have been omitted. These lines were most likely due to scattering effects.

E_γ[†]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[&]	$I_{(\gamma+ce)}$[@]	Comments
13.4	<0.01	175.329	9/2$^+$	161.942	7/2$^+$				0.10 *1*	E_γ: from level energy difference. $I_{(\gamma+ce)}$: from intensity balance.
51.34 *2*	0.045 *5*	301.169	5/2$^+$	249.800	5/2$^-$	E1		0.570		α(K)=0.506 *7*; α(L)=0.0549 *8*; α(M)=0.00843 *12*; α(N)=0.000681 *10*
62.2 *4*	<0.005	301.169	5/2$^+$	239.012	3/2$^-$	[E1]		0.325 *8*		α(K)=0.289 *7*; α(L)=0.0310 *8*; α(M)=0.00477 *12*; α(N)=0.000389 *10*
81.15 *2*	0.024 *3*	520.653	3/2$^-$	439.493	5/2$^-$					
87.854 *5*	12.7 *7*	249.800	5/2$^-$	161.942	7/2$^+$	E1		0.1165		α(K)=0.1037 *15*; α(L)=0.01101 *16*; α(M)=0.001698 *24*; α(N)=0.0001402 *20*
125.84 *2*	0.075 *7*	301.169	5/2$^+$	175.329	9/2$^+$	E2		0.354		α(K)=0.308 *5*; α(L)=0.0396 *6*; α(M)=0.00613 *9*; α(N)=0.000477 *7*
139.243 *15*	0.62 *4*	301.169	5/2$^+$	161.942	7/2$^+$	M1+E2	0.75 *3*	0.114 *4*		α(K)=0.100 *4*; α(L)=0.0121 *5*; α(M)=0.00188 *7*; α(N)=0.000150 *6* δ: from ce data in ^{76}Se(n,γ).
161.932 *10*	9.2 *5*	161.942	7/2$^+$	0.0	1/2$^-$	E3		0.881		α(K)=0.735 *11*; α(L)=0.1251 *18*; α(M)=0.0195 *3*; α(N)=0.001413 *20*
200.47 *2*	0.067 *7*	439.493	5/2$^-$	239.012	3/2$^-$	M1+E2	+0.09 *3*	0.0165 *4*		α(K)=0.0146 *4*; α(L)=0.00158 *4*; α(M)=0.000245 *6*; α(N)=2.08×10^{-5} *5* δ: from $\gamma(\theta)$ in ^{74}Ge(α,nγ).
239.011 *6*	100	239.012	3/2$^-$	0.0	1/2$^-$	M1+E2	+0.152 *4*	0.01080		α(K)=0.00960 *14*; α(L)=0.001031 *15*; α(M)=0.0001607 *23*; α(N)=1.362×10^{-5} *20*
249.805 *8*	24.8 *10*	249.800	5/2$^-$	0.0	1/2$^-$	E2		0.0284		α(K)=0.0251 *4*; α(L)=0.00285 *4*; α(M)=0.000442 *7*; α(N)=3.62×10^{-5} *5*
270.850 *12*	0.52 *3*	520.653	3/2$^-$	249.800	5/2$^-$	M1+E2	−0.30 *6*	0.0087 *5*		α(K)=0.0077 *4*; α(L)=0.00083 *5*; α(M)=0.000129 *8*; α(N)=1.09×10^{-5} *6*
281.642 *8*	3.64 *18*	520.653	3/2$^-$	239.012	3/2$^-$	M1+E2	+0.12 *4*	0.00699 *16*		α(K)=0.00622 *15*; α(L)=0.000664 *16*; α(M)=0.0001034 *25*; α(N)=8.79×10^{-6}
439.493 *20*	0.064 *7*	439.493	5/2$^-$	0.0	1/2$^-$	E2		0.00413 *6*		α(K)=0.00366 *6*; α(L)=0.000398 *6*; α(M)=6.19×10^{-5} *9*; α(N)=5.18×10^{-6} *8*
520.654 *15*	35.1 *14*	520.653	3/2$^-$	0.0	1/2$^-$	M1+E2	+0.17 *7*	0.00160 *4*		α(K)=0.00143 *3*; α(L)=0.000150 *3*; α(M)=2.34×10^{-5} *5*; α(N)=2.00×10^{-6} *4*

[†] From 1983Da24.
[‡] From ce data in ^{76}Se(n,γ).
[#] From the Adopted Gammas.

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$\gamma(^{77}Se)$ (continued)

[@] For absolute intensity per 100 decays, multiply by 0.0159 *24*.

[&] 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.

$^{77}_{34}Se_{43}$-3

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays