^{97}Y β^- decay (1.17 s) 1976MoZC,1996Lh03

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 111, 525 (2010)	19-Nov-2009

Parent: ^{97}Y: E=667.52 *23*; $J^\pi=(9/2)^+$; $T_{1/2}$=1.17 s *3*; Q(β^-)=6689 *11*; %β^- decay>99.3

^{97}Y-From adopted values for ^{97}Y.

1996Lh03: ^{232}Th(p,F) E=25 MeV; on-line mass separation (IGISOL) and 12 Compton-suppressed Ge array (TARDIS); measured Eγ, Iγ, $\gamma\gamma$.

1976MoZC: mass separated fission products; measured Eγ, Iγ, ce, prompt and delayed $\gamma\gamma$ and $\beta\gamma$ coincidences. Ge(Li), FWHM 2.0 keV to 2.3 keV at 1332 keV, surface barrier detector for the fissions.

Others: 1985Be20 ($\gamma\gamma(\theta$,H,t), $T_{1/2}$, γ), 1978St02 (Eβ), 1975Gu03 (Eγ, Iγ, $\beta\gamma$).

All data are from 1996Lh03, unless otherwise noted.

^{97}Zr Levels

E(level)†	J^π‡	$T_{1/2}$‡	Comments
0.0	$1/2^+$	16.749 h *8*	%β^-=100 %β^-: from Adopted Levels.
1103.12 *15*	$3/2^+$		
1264.35 *17*	$7/2^+$	102.8 ns *24*	g=+0.39 *4* (1985Be20) g: by time-differential perturbed angular correlation; g-factor indicates a simple Configuration=(ν $g_{7/2}$) (1985Be20).
1400.01 *15*	$(3/2^+,5/2^+)$		
1806.91 *18*	$(7/2^-)$		
1859.14 *18*	$(3/2^+,5/2^+)$	<8.9 ps	
1996.42 *21*	$(5/2^+)$	<2 ps	
2057.6 *3*	$(5/2^+)$		
2234.36 *19*	$(7/2)^+$		
2263.63 *22*	$(11/2^-)$	1.7 ns *3*	$T_{1/2}$: from 1996Lh03.
2338.0 *3*	(7/2,9/2)		
2508.55 *22*	(7/2,9/2)		
2592.8 *3*			
2624.9 *3*			
2626.0 *4*	$(7/2^+)$		
2742.2 *8*	(1/2,3/2)		
2813.7 *6*	(7/2,9/2,11/2)		
2839.0 *4*	$(7/2^+,9/2,11/2^+)$		
2870.0 *5*	$(7/2,9/2,11/2^+)$		
3026.2?			
3135.4?			
3161.2 *3*	$(7/2^+,9/2^+)$		
3184.6?			
3287.7 *4*	$(3/2^-)$		
3402.1 *9*			
3424.47 *24*	$(7/2^-,9/2,11/2^+)$		
3469.4?			
3962.8 *6*	$(7/2^+,9/2^+,11/2^+)$		
4046.4 *6*	$(7/2^+)$		
4117.8 *4*	$(9/2^+,11/2^+)$		

† From a least squares fit to Eγ.

‡ ADOPTED values.

^{97}Y β^- decay (1.17 s) 1976MoZC,1996Lh03 (continued)

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(3239 *11*)	4117.8	1.30 *25*	5.28 *9*	av Eβ=1377.9 *53*
(3310 *11*)	4046.4	1.4 *5*	5.29 *16*	av Eβ=1411.9 *53*
(3394 *11*)	3962.8	0.90 *23*	5.53 *12*	av Eβ=1451.6 *53*
(3932 *11*)	3424.47	2.5 *6*	5.37 *11*	av Eβ=1708.5 *53*
(4195 *11*)	3161.2	1.8 *3*	5.63 *8*	av Eβ=1834.6 *53*
(4487 *11*)	2870.0	1.10 *20*	5.97 *8*	av Eβ=1974.2 *53*
(4518 *11*)	2839.0	1.1 *3*	5.99 *12*	av Eβ=1989.1 *53*
(4543 *11*)	2813.7	0.30 *10*	6.56 *15*	av Eβ=2001.2 *53*
(4731 *11*)	2626.0	1.10 *23*	6.08 *10*	av Eβ=2091.4 *53*
(4732 *11*)	2624.9			Iβ^-: GTOL upper limit (method 1): 0.6.
(4764 *11*)	2592.8			Iβ^-: GTOL upper limit (method 1): 0.4.
(4848 *11*)	2508.55	8.1 *4*	5.257 *25*	av Eβ=2147.8 *53*
(5019 *11*)	2338.0	2.1 *4*	5.91 *9*	av Eβ=2229.7 *53*
(5093 *11*)	2263.63	2.1 *5*	5.94 *11*	av Eβ=2265.5 *53*
(5122 *11*)	2234.36	43.1 *21*	4.638 *25*	av Eβ=2279.6 *53* E(decay): Eβ^-=5010 in coin with 161γ, Eβ^-=5100 *150* in coin with 970γ (1978St02).
(5299 *11*)	2057.6	0.7 *3*	6.49 *19*	av Eβ=2364.6 *53*
(5360 *11*)	1996.42	1.0 *4*	6.36 *18*	av Eβ=2394.0 *53*
(5497 *11*)	1859.14			Iβ^-: GTOL upper limit (method 1): 1.1.
(5550 *11*)	1806.91	1.8 *5*	6.17 *13*	av Eβ=2485.2 *53*
(5957 *11*)	1400.01			Iβ^-: GTOL upper limit (method 1): 3.1.
(6092 *11*)	1264.35	31.6 *24*	5.11 *4*	av Eβ=2746.3 *53* E(decay): Eβ=5950 *200* in coin with 161γ (1978St02).
(6253 *11*)	1103.12			Iβ^-: GTOL upper limit (method 1): 2.7.
(7357 *11*)	0.0			Iβ^-: GTOL upper limit (method 1): 3.8.

† Deduced from the intensity balance with Iβ(g.s.)=0.

‡ For absolute intensity per 100 decays, multiply by >0.993.

^{97}Y β^- decay (1.17 s) 1976MoZC,1996Lh03 (continued)

$\gamma(^{97}Zr)$

E_γ	I_γ[†][b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[c]	Comments
136.4 *4*	0.05 *3*	1400.01	(3/2$^+$,5/2$^+$)	1264.35	7/2$^+$			
161.2 *2*	73.0 *8*	1264.35	7/2$^+$	1103.12	3/2$^+$	[E2]	0.195	α(K)=0.1669 *25*; α(L)=0.0238 *4*; α(M)=0.00415 *7*; α(N+..)=0.000589 *9* α(N)=0.000561 *9*; α(O)=2.86×10^{-5} *5* $\Delta I\gamma$: 73.0 *8* adopted by evaluator. 73 *8* given by 1996Lh03 seems to have a too big uncertainty, which seems to Be sustained by the other intensities (much smaller).
189.6[#] *3*	0.04[#] *2*	1996.42	(5/2$^+$)	1806.91	(7/2$^-$)	D		
254.6[#] *3*	0.04[#] *2*	2592.8		2338.0	(7/2,9/2)			
274.3 *4*	0.1[a]	2508.55	(7/2,9/2)	2234.36	(7/2)$^+$			
[x]280[@] *1*	[@]							I_γ: 20.5 *11*.
296.8 *2*	1.5 *4*	1400.01	(3/2$^+$,5/2$^+$)	1103.12	3/2$^+$			
361.3 *2*	0.5 *2*	2624.9		2263.63	(11/2$^-$)			
375.2 *2*	3.7 *2*	2234.36	(7/2)$^+$	1859.14	(3/2$^+$,5/2$^+$)			
407.1 *2*	4.1 *2*	1806.91	(7/2$^-$)	1400.01	(3/2$^+$,5/2$^+$)			
427.7 *4*	0.7 *2*	2234.36	(7/2)$^+$	1806.91	(7/2$^-$)			
456.7 *2*	1.5 *2*	2263.63	(11/2$^-$)	1806.91	(7/2$^-$)	(E2)	0.00552	α(K)=0.00483 *7*; α(L)=0.000569 *8*; α(M)=9.88×10^{-5} *14*; α(N+..)=1.473×10^{-5} *21* α(N)=1.383×10^{-5} *20*; α(O)=9.01×10^{-7} *13*
[x]530[@] *1*	[@]							I_γ: 23.3 *13*.
542.5 *3*	0.7 *2*	1806.91	(7/2$^-$)	1264.35	7/2$^+$			
594.7 *2*	1.2 *4*	1859.14	(3/2$^+$,5/2$^+$)	1264.35	7/2$^+$	D,E2		
595.8[#] *4*	0.08[#] *5*	1996.42	(5/2$^+$)	1400.01	(3/2$^+$,5/2$^+$)	D,E2		
652.9 *4*	0.1[a]	3161.2	(7/2$^+$,9/2$^+$)	2508.55	(7/2,9/2)			
701.9 *3*	0.4 *1*	2508.55	(7/2,9/2)	1806.91	(7/2$^-$)			
756.1 *2*	3.3 *5*	1859.14	(3/2$^+$,5/2$^+$)	1103.12	3/2$^+$	D,E2		
766.9 *4*	0.2 *1*	2626.0	(7/2$^+$)	1859.14	(3/2$^+$,5/2$^+$)			
833.8 *6*	0.3 *1*	2234.36	(7/2)$^+$	1400.01	(3/2$^+$,5/2$^+$)			
[x]881.5[&] *4*	0.2[&] *1*							
[x]893[@] *1*	[@]							I_γ: 37.2 *20*.
920.9[d] *4*	0.2 *1*	3184.6?		2263.63	(11/2$^-$)			
938.2 *4*	1.4 *3*	2338.0	(7/2,9/2)	1400.01	(3/2$^+$,5/2$^+$)			
954.4[#] *4*	0.3[#] *2*	2057.6	(5/2$^+$)	1103.12	3/2$^+$			
960.9[d] *4*	0.8 *3*	3469.4?		2508.55	(7/2,9/2)			
970.0 *2*	39 *2*	2234.36	(7/2)$^+$	1264.35	7/2$^+$			
979.7 *4*	0.2 *1*	2839.0	(7/2$^+$,9/2,11/2$^+$)	1859.14	(3/2$^+$,5/2$^+$)			
999.4 *3*	2.3 *2*	2263.63	(11/2$^-$)	1264.35	7/2$^+$	[M2]	1.60×10^{-3}	α(K)=0.001406 *20*; α(L)=0.0001580 *23*; α(M)=2.75×10^{-5} *4*; α(N+..)=4.18×10^{-6} *6* α(N)=3.90×10^{-6} *6*; α(O)=2.77×10^{-7} *4*

$^{97}_{40}Zr_{57}$-3

^{97}Y β^- decay (1.17 s) 1976MoZC,1996Lh03 (continued)

$\gamma(^{97}Zr)$ (continued)

E_γ	I_γ[†][b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[c]	Comments
[x]1002.6[&] 7	0.2[&] 1							
1073.3 3	0.7 2	2338.0	(7/2,9/2)	1264.35	$7/2^+$			
[x]1091[@] 1	[@]							I_γ: 56 3.
1103.0 2	93 2	1103.12	$3/2^+$	0.0	$1/2^+$			
[x]1125[@] 1	[@]							I_γ: 35.3 19.
1131.0 4	1.0 3	2234.36	$(7/2)^+$	1103.12	$3/2^+$			
1160.9 3	0.4 1	3424.47	$(7/2^-,9/2,11/2^+)$	2263.63	$(11/2^-)$			
1190.0 2	0.6 2	3424.47	$(7/2^-,9/2,11/2^+)$	2234.36	$(7/2)^+$			
1193.0[#] 3	0.4[#] 2	2592.8		1400.01	$(3/2^+,5/2^+)$			
1207.1[d] 6	0.2 1	3469.4?		2263.63	$(11/2^-)$			
1219.2[d] 5	0.2 1	3026.2?		1806.91	$(7/2^-)$			
1244.1 2	7.7 3	2508.55	(7/2,9/2)	1264.35	$7/2^+$			
1264.2[d] 5	2.8 10	1264.35	$7/2^+$	0.0	$1/2^+$	[M3]	1.72×10^{-3}	α(K)=0.001509 22; α(L)=0.0001724 25; α(M)=3.00×10^{-5} 5; α(N+..)=5.54×10^{-6} 8 α(N)=4.26×10^{-6} 6; α(O)=3.00×10^{-7} 5; α(IPF)=9.78×10^{-7} 16 observed by 1976MoZC but not by 1996Lh03 (possible 161γ-1103γ coincidence summing); Iγ from I(161γ,1996Lh03) and γ branching ratio from 1976MoZC.
1291.2[#] 4	[#]	3287.7	$(3/2^-)$	1996.42	$(5/2^+)$			
1302.1 3	0.6 2	3161.2	$(7/2^+,9/2^+)$	1859.14	$(3/2^+,5/2^+)$			
1328.4[d] 4	0.3 2	3135.4?		1806.91	$(7/2^-)$			
1337.6[d] 5	0.2 1	3962.8	$(7/2^+,9/2^+,11/2^+)$	2626.0	$(7/2^+)$			
1354.2 4	0.4 1	3161.2	$(7/2^+,9/2^+)$	1806.91	$(7/2^-)$			
1369.7 8	0.2 1	3962.8	$(7/2^+,9/2^+,11/2^+)$	2592.8				
1400.0 2	6.1 14	1400.01	$(3/2^+,5/2^+)$	0.0	$1/2^+$			
1428.9[#] 5	[#]	3287.7	$(3/2^-)$	1859.14	$(3/2^+,5/2^+)$			
1438.9 6	0.5 2	2839.0	$(7/2^+,9/2,11/2^+)$	1400.01	$(3/2^+,5/2^+)$			
1493.0 5	0.2 1	4117.8	$(9/2^+,11/2^+)$	2624.9				
1522.9 5	0.9 2	2626.0	$(7/2^+)$	1103.12	$3/2^+$			
1524.9 6	0.3 1	4117.8	$(9/2^+,11/2^+)$	2592.8				
1538.3[d] 9	0.1[a]	4046.4	$(7/2^+)$	2508.55	(7/2,9/2)			
1549.3 5	0.3 1	2813.7	(7/2,9/2,11/2)	1264.35	$7/2^+$			
1575.1 6	0.4 2	2839.0	$(7/2^+,9/2,11/2^+)$	1264.35	$7/2^+$			
1605.6 4	1.1 2	2870.0	$(7/2,9/2,11/2^+)$	1264.35	$7/2^+$			
1617.2[d] 7	0.1[a]	3424.47	$(7/2^-,9/2,11/2^+)$	1806.91	$(7/2^-)$			
1639.1[#] 7	[#]	2742.2	(1/2,3/2)	1103.12	$3/2^+$			
1708.0[d] 8	0.3 1	4046.4	$(7/2^+)$	2338.0	(7/2,9/2)			
1728.5 6	0.7 2	3962.8	$(7/2^+,9/2^+,11/2^+)$	2234.36	$(7/2)^+$			
1811.9 8	0.2 1	4046.4	$(7/2^+)$	2234.36	$(7/2)^+$			
1854.0 7	0.8 2	4117.8	$(9/2^+,11/2^+)$	2263.63	$(11/2^-)$			

$^{97}_{40}Zr_{57}$-4

^{97}Y β^- decay (1.17 s) 1976MoZC,1996Lh03 (continued)

$\gamma(^{97}Zr)$ (continued)

E_γ	I_γ[†][b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[c]	Comments
1887.1[#] *8*	[#]	3287.7	(3/2$^-$)	1400.01	(3/2$^+$,5/2$^+$)			
1896.3 *9*	0.7 *2*	3161.2	(7/2$^+$,9/2$^+$)	1264.35	7/2$^+$			
1996.6 *3*	0.9 *4*	1996.42	(5/2$^+$)	0.0	1/2$^+$	(E2)	4.68×10^{-4}	α(K)=0.0001442 *21*; α(L)=1.565×10^{-5} *22*; α(M)=2.71×10^{-6} *4*; α(N+..)=0.000306 *5* α(N)=3.86×10^{-7} *6*; α(O)=2.76×10^{-8} *4*; α(IPF)=0.000305 *5*
2057.7 *4*	0.4 *2*	2057.6	(5/2$^+$)	0.0	1/2$^+$			
2161.1 *7*	1.5 *5*	3424.47	(7/2$^-$,9/2,11/2$^+$)	1264.35	7/2$^+$			
2299.0[#] *8*	[#]	3402.1		1103.12	3/2$^+$			
2311.1[d] *6*	0.4 *2*	4117.8	(9/2$^+$,11/2$^+$)	1806.91	(7/2$^-$)			
2943.3 *8*	1.2 *4*	4046.4	(7/2$^+$)	1103.12	3/2$^+$			

[†] Absolute intensities reported by 1996Lh03 (based on No β^- feeding to ^{97}Zr g.s.).
[‡] From Adopted Gammas.
[#] Transition fed in the decay of the 1/2$^-$ g.s. (^{97}Y β^- decay (3.75 s)), but interfering with the decay of the 9/2$^+$, 668 isomer in ^{97}Y (this dataset), or fed in both decays. When listed, the intensity is the calculated contribution of the 9/2$^+$ isomer (1996Lh03).
[@] From 1975Gu03, which give intensities ($\Delta I\gamma$=5%) relative to 1104γ, later placed At 1103 level. Listed here are absolute intensities (recalculated by evaluator). Notice that these rather high intensity γ's would remain unplaced by the later studies, whence the question whether they really belong to this decay. For this reason the intensities are listed In comments.
[&] From 1996Lh03 (absolute intensities).
[a] Coincidence near the detection limit in the $\gamma\gamma$ data in 1996Lh03 (50% accuracy of intensity).
[b] For absolute intensity per 100 decays, multiply by >0.993.
[c] 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.
[d] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

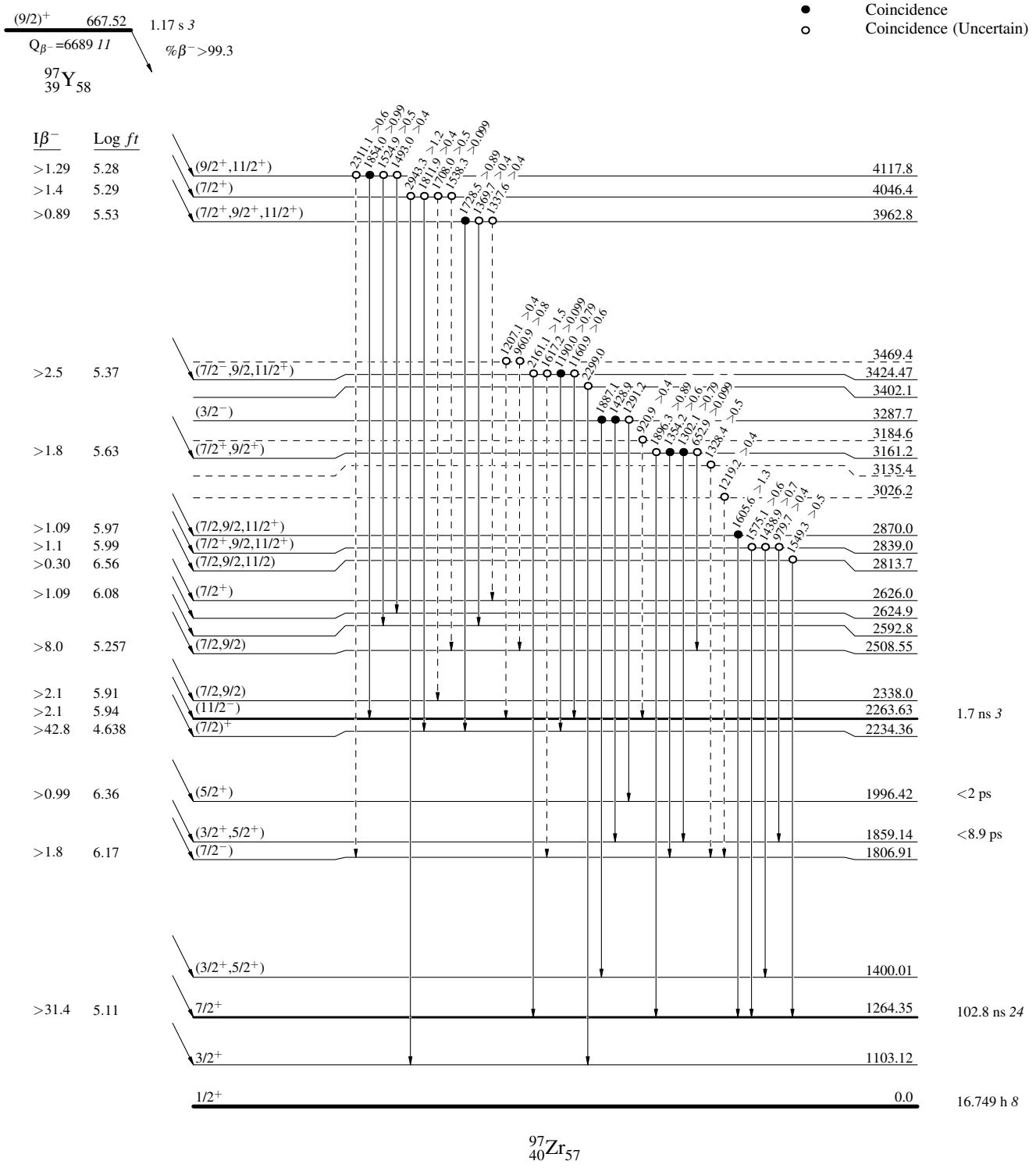
$^{97}_{40}Zr_{57}$-5

^{97}Y β^- decay (1.17 s) 1976MoZC,1996Lh03

Decay Scheme

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

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
- Coincidence (Uncertain)



^{97}Y β^- decay (1.17 s) 1976MoZC,1996Lh03

Decay Scheme (continued)

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