^{54}V β^- decay 1977Na17,1970Wa14,1956Sc54

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yang Dong, Huo Junde	NDS 121, 1 (2014)	20-Jun-2014

Parent: ^{54}V: E=0.0; $J^\pi=3^+$; $T_{1/2}$=49.8 s *5*; Q(β^-)=7042 *15*; %β^- decay=100.0

Additional information 1.

1977Na17: produced by ^{48}Ca(^{9}Be,2np) at E=20 MeV. 99.9% enriched target, $\gamma\gamma$(t), $\beta\gamma$(t), Ge(Li) detector.

1970Wa14: produced by ^{54}Cr(n,p) at E=14 MeV. 94.1% enriched target, $\gamma\gamma$- and $\beta\gamma$-coincidence, Ge(Li), plastic detector.

^{54}Cr Levels

E(level)†	Jπ‡	Comments
0.0	0^+	
834.81 *18*	2^+	
1823.82 *21*	4^+	
2619.45 *20*	2^+	
3073.87 *23*	2^+	
3159.50 *23*	4^+	
3222.30 *24*	6^+	
3436.8 *3*	2^+	
3655.1 *3*	4^+	
3785.60 *23*	$(4,5)^+$	
3798.46 *22*	4^+	
4083.06 *21*	$2^+,3^+,4^+$	Jπ: γ's to 2^+, 4^+, so $J^\pi=2^+$, 3, 4^+; log *ft*=4.81 from 3^+, so $\Delta\pi$=+, this rules out 3^-.
4218.05 *24*	$2^+,3^+,4^+$	Jπ: γ's to 2^+, 4^+, so $J^\pi=2^+$, 3, 4^+; log *ft*=5.69 from 3^+, so $\Delta\pi$=+, this rules out 3^-.
4450.9 *5*	4^+	

† From using least-squares adjustment procedures.

‡ From Adopted Levels, except as noted.

β^- radiations

E(decay)	E(level)	Iβ⁻†#	Log *ft*	Comments
(2591 *15*)	4450.9	1.6 *6*	6.23 *17*	av Eβ=1097 *8*
(2824 *15*)	4218.05	7.0 *17*	5.75 *11*	av Eβ=1208 *8*
(2959 *15*)	4083.06	65.9 *22*	4.87 *3*	av Eβ=1273 *8* E(decay): Eβ=2.95 MeV *10* from βγ-coincidence spectra (1970Wa14).
(3244 *15*)	3798.46	11.6 *14*	5.79 *6*	av Eβ=1409 *8*
(3256 *15*)	3785.60	15.0 *11*	5.69 *4*	av Eβ=1415 *8*
(3387 *15*)	3655.1	4.8 *10*	6.26 *10*	av Eβ=1478 *8*
(3605 *15*)	3436.8	<1.2	>7.0	av Eβ=1584 *8* Iβ⁻: Σ Iγ 0.5 *7* from intensity balance.
(3820 *15*)	3222.30			Iβ⁻: Iβ<2 from 1977Na17. Σ Iγ 0.3 *8* from intensity balance, so then Iβ should be<1.1. But this level not expected to be fed since ΔJ=3.
(3883 *15*)	3159.50	‡		
(3968 *15*)	3073.87			Iβ⁻: from Σ Iγ −0.1 *7* from intensity balance.
(4423 *15*)	2619.45	2.4 *17*	7.1 *3*	av Eβ=1980 *8*
(5218 *15*)	1823.82	4 *3*	7.2 *4*	av Eβ=2368 *8* E(decay): Eβ=5.2 MeV *2* from singles β^-ray spectra (1970Wa14).
(6207 *15*)	834.81	‡		

† The decay scheme is that of 1977Na17 based on extensive coincidence and γ's data with the decay scheme as proposed. There is an intensity imbalance at 835- and 3160-keV levels. Due to the negative imbalances, the positive β branches as given, sum to

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^{54}V β^- decay 1977Na17,1970Wa14,1956Sc54 (continued)

β^- radiations (continued)

114 rather than 100. This reflects the incompleteness of the decay scheme.
‡ Negative imbalance at 835 level with Iβ=−4.9 *19* and at 3160 level with Iβ=−7.6 *13*.
# Absolute intensity per 100 decays.

$\gamma(^{54}Cr)$

Iγ normalization: from Σ (I(γ+ce) to g.s.)=100,B− feeding to g.s. is expected to be negligible since ΔJ=3.
All data are from 1977Na17, except as noted.

E_γ	I_γ†@	E_i(level)	J_i^π	E_f	J_f^π
563.68 *19*	4.36 *22*	3785.60	$(4,5)^+$	3222.30	6^+
626.56 *27*	0.76 *34*	3785.60	$(4,5)^+$	3159.50	4^+
639.35 *25*	3.70 *44*	3798.46	4^+	3159.50	4^+
646.27 *24*	2.3 *4*	4083.06	$2^+,3^+,4^+$	3436.8	2^+
834.75 *18*	100.0 *7*	834.81	2^+	0.0	0^+
923.29 *20*	8.3 *8*	4083.06	$2^+,3^+,4^+$	3159.50	4^+
988.96 *17*	82.5 *7*	1823.82	4^+	834.81	2^+
1009.25 *16*	1.4 *6*	4083.06	$2^+,3^+,4^+$	3073.87	2^+
1336.22 *40*	2.6 *5*	3159.50	4^+	1823.82	4^+
1398.63 *13*	4.7 *7*	3222.30	6^+	1823.82	4^+
1463.51 *9*	8.9 *7*	4083.06	$2^+,3^+,4^+$	2619.45	2^+
1784.44 *12*	8.4 *7*	2619.45	2^+	834.81	2^+
1831.27 *19*	4.9 *10*	3655.1	4^+	1823.82	4^+
1961.53 *11*	10.3 *10*	3785.60	$(4,5)^+$	1823.82	4^+
1974.33 *12*	4.6 *10*	3798.46	4^+	1823.82	4^+
2239.11 *20*	1.3‡ *4*	3073.87	2^+	834.81	2^+
2259.35 *11*	47.0 *15*	4083.06	$2^+,3^+,4^+$	1823.82	4^+
2325.02 *40*	2.3‡ *6*	3159.50	4^+	834.81	2^+
x2353# *3*	11.5# *20*				
2394.82 *36*	3.1 *15*	4218.05	$2^+,3^+,4^+$	1823.82	4^+
2602.04 *40*	2.8 *5*	3436.8	2^+	834.81	2^+
2621.3 *11*	3.0 *14*	2619.45	2^+	0.0	0^+
2627.00 *42*	1.6‡ *6*	4450.9	4^+	1823.82	4^+
x2820# *50*	≈4#				
2964.29 *25*	3.6 *9*	3798.46	4^+	834.81	2^+
x3170# *5*	11.8# *25*				
3382.96 *18*	4.1 *8*	4218.05	$2^+,3^+,4^+$	834.81	2^+

† Normalized to 835γ from 1977Na17.
‡ Observed in coincidence only. The intensity is that derived from the 835-keV gate.
# Observed and assigned in the level scheme by 1970Wa14 only.
@ For absolute intensity per 100 decays, multiply by 0.971 *13*.
x γ ray not placed in level scheme.

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Decay Scheme

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