^{51}K β^- decay (365 ms) 2006Pe16,1983RaZR

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Wang Jimin and Huang Xiaolong	NDS 144, 1 (2017)	1-Mar-2016

Parent: ^{51}K: E=0; $J^\pi=3/2^+$; $T_{1/2}$=365 ms *5*; Q(β^-)=13816 *13*; %β^- decay=100.0

^{51}K-%β^- decay: %β^-=100 (1983RaZR and 1983La23).

2006Pe16: ^{51}K isotope produced in spallation reaction by bombarding a UC_x target by a 1.4 GeV proton beam produced by the CERN proton-synchroton booster (PSB). Spallation products analyzed using the high resolution separator (HRS). Measured Eγ, $\gamma\gamma$, β, βn coin, $\beta n\gamma$ coin, $\beta\gamma$ coin, and $\beta\gamma\gamma$ coin. The γ rays were detected using two large Ge clusters from the MINIBALL array. Low energy neutrons detected using six detectors each composed of a thick BC400 plastic scintillor. High energy neutrons were detected using 11 curved BC400 scintillating plastic bars from the TONNERRE array. The β particles were detected using a cylindrical plastic scintillator.

1983RaZR: source produced by U(p,X) E=600 MeV; measured β-delayed neutron, βn, $\beta\gamma$, $\beta\gamma$n. Shell-model calculations.

1983La23: source produced by Ir(p,X) E=10 GeV; measured β-delayed neutron yield, emission probability, and $T_{1/2}$.

See also 1986Ly02 and 1983Ly06.

^{51}Ca Levels

E(level)†	J^π	$T_{1/2}$	Comments
0	$3/2^{(-)}$	10.0 s *8*	J^π,$T_{1/2}$: From the Adopted Levels.
3460 *2*	$(7/2^-)$		J^π: From the Adopted Levels isotopic chain. E(level): From Eγ.
5678 *34*			
6684 *34*			
6776 *38*			
7060 *55*			E(level): 7040-7100, two closely spaced levels.
7420 *55*			
811×10^1 *10*			E(level): 8080-8180, two closely spaced levels.
8360 *30*			
8620 *30*			
8820 *46*			
905×10^1 *10*			E(level): 8980-9110, three closely spaced levels.
9330 *64*			E(level): 9320-9330, two closely spaced levels.
959×10^1 *12*			
9700 *64*			E(level): 9700-9703, two closely spaced levels.
982×10^1 *15*			E(level): 9780-9840, two closely spaced levels.
1034×10^1 *13*			E(level): 10300-10450, two closely spaced levels.
1067×10^1 *12*			
1089×10^1 *10*			

† Calculated using S(n) (^{51}Ca)=4814.4 *17* (2017Wa10), the measured energies of delayed neutrons (2006Pe16), taking into account the recoil energy of the final nucleus.

β^- radiations

All data are from 2006Pe16, except as noted.

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(2.93×10^3 *10*)	10890	0.2 *1*	5.12 *23*	av Eβ=1265 *51*
(3.15×10^3 *12*)	10670	0.3 *1*	5.08 *17*	av Eβ=1370 *60*
(3.48×10^3 *13*)	10340	0.4 *1*	5.15 *14*	av Eβ=1530 *65*
(4.00×10^3 *15*)	9820	1.7 *4*	4.79 *13*	av Eβ=1782 *75*

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^{51}K β^- decay (365 ms) 2006Pe16,1983RaZR (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†][‡]	Log *ft*	Comments
(4.12×10^3 *7*)	9700	0.9 *2*	5.12 *11*	av Eβ=1840 *33*
(4.23×10^3 *12*)	9590	1.2 *3*	5.05 *13*	av Eβ=1893 *61*
(4.49×10^3 *7*)	9330	0.6 *2*	5.47 *15*	av Eβ=2020 *33*
(4.77×10^3 *10*)	9050	3.1 *7*	4.87 *11*	av Eβ=2157 *51*
(5.00×10^3 *5*)	8820	1.0 *3*	5.46 *14*	av Eβ=2269 *25*
(5.20×10^3 *3*)	8620	0.5 *1*	5.83 *9*	av Eβ=2367 *18*
(5.46×10^3 *3*)	8360	0.11 *5*	6.59 *20*	av Eβ=2494 *18*
(5.71×10^3 *10*)	8110	5.1 *7*	5.01 *7*	av Eβ=2616 *52*
(6.40×10^3 *6*)	7420	4.9 *6*	5.26 *6*	av Eβ=2955 *29*
(6.76×10^3 *6*)	7060	27.4 *30*	4.62 *6*	av Eβ=3131 *29*
(7.04×10^3 *4*)	6776	2.1 *3*	5.82 *7*	av Eβ=3269 *21*
(7.13×10^3 *4*)	6684	1.3 *3*	6.05 *11*	av Eβ=3316 *20*
(8.14×10^3 *4*)	5678	14.2 *18*	5.28 *6*	av Eβ=3810 *20*
(10356 *13*)	3460	3.9 *5*	6.34 *6*	av Eβ=4899 *15*
(13816 *13*)	0	31 *8*	6.03 *12*	av Eβ=6595 *15*

Iβ^-: from %β^-n probability (65 *8*) and the feeding of the first excited state in ^{51}Ca.

[†] Normalized the total intensity of the delayed neutrons to the 1n-emission probability P_{1n}=65 *8*.
[‡] Absolute intensity per 100 decays.

$\gamma(^{51}Ca)$

Only one γ, the 3460 keV transition is attributed to ^{51}Ca, the observed 3530 keV transition attributed to ^{51}Ca in 1983RaZR is ruled out and attributed to ^{50}Ca through β-γ-n coincidences (2006Pe16).

Eγ	Iγ[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Comments
3460 *2*	3.9 *5*	3460	(7/2$^-$)	0	3/2$^{(-)}$	Iγ: intensity/100 decays of ^{51}K (2006Pe16). Eγ: From 2006Pe16. Other: 3460, ΔE and Iγ are not given (1983RaZR).

[†] Absolute intensity per 100 decays.

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Decay Scheme

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