^{49}K β^-n decay 1983RaZR,1982Ca04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 179, 1 (2022)	30-Nov-2021

Parent: ^{49}K: E=0.0; J^π=(1/2$^+$,3/2$^+$); $T_{1/2}$=1.26 s *5*; Q(β^-n)=6542.1 *8*; %β^-n decay=86 *9*

^{49}K-E,J^π,$T_{1/2}$: From Adopted Levels of ^{49}K in ENSDF database.

^{49}K-Q(β^-n): From 2021Wa16.

^{49}K-%β^-n decay: From simultaneous β and n measurements assuming %β^-n(^{9}Li)=50 *4* (1982Ca04).

1983RaZR, 1982Ca04: ^{49}K source ions were produced via U(p,X) with E=600 MeV protons from the CERN synchrocyclotron and separated by the ISOLDE on-line mass separator. β particles were detected with a plastic scintillator located inside a neutron long-counter equipped with eight ^{3}He proportional counters; γ rays were detected with a Ge(Li) detector. Measured Eβ, Iβ, Eγ, Iγ, E(n), I(n), β(t), γ(t), βn- and γn-coin. Deduced levels, decay branching ratios. The thesis of 1983RaZR is apparently a more complete report of the work presented by 1982Ca04.

All data are from 1983RaZR, except as noted.

^{48}Ca Levels

E(level)†	J^π†	$T_{1/2}$†	Comments
0.0	0$^+$	2.9×10^{19} y *+42−11*	%β^-=22 *+30−22*; %2β^-=78 *+22−30* %β^-,%2β^-: from Adopted Levels.
3831.96	2$^+$		
4283.56	0$^+$		

† From Adopted Levels.

γ(^{48}Ca)

E_γ†	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.†	α#	$I_{(\gamma+ce)}$	Comments
451.9 *5*	8 *1*	4283.56	0$^+$	3831.96	2$^+$	(E2)	0.000934 *14*		α=0.000934 *14*; α(K)=0.000851 *12*; α(L)=7.37×10^{-5} *11*; α(M)=8.73×10^{-6} *13*; α(N+..)=4.89×10^{-7} *7* α(N)=4.89×10^{-7} *7* γn not observed (high low-energy background).
3831.56 *7*	100	3831.96	2$^+$	0.0	0$^+$	E2	0.001120 *16*		α=0.001120 *16*; α(K)=6.68×10^{-6} *10*; α(L)=5.71×10^{-7} *8*; α(M)=6.78×10^{-8} *10*; α(N+..)=0.001111 *16* α(N)=3.86×10^{-9} *6*; α(IPF)=0.001111 *16* In coincidence with 0.12 MeV *3*, 0.30 MeV *5*, and 0.60 MeV *6* neutrons.
(4284)		4283.56	0$^+$	0.0	0$^+$	E0		2.3 *3*	$I_{(\gamma+ce)}$: from the adopted branching ratios and Iγ(452γ).

† From Adopted Gammas.

‡ Relative photon intensity from singles measurement.

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.

^{49}K β^-n decay 1983RaZR,1982Ca04 (continued)

Delayed Neutrons (^{48}Ca)

Particle normalization: From simultaneous β and n measurements assuming $\%\beta^-n(^9Li)=50$ *4* (1982Ca04).

E(n)†	E(^{48}Ca)	I(n)‡@	E(^{49}Ca)#	E(n)†	E(^{48}Ca)	I(n)‡@	E(^{49}Ca)#
1.2×10^2 *3*	3831.96	0.2	9.10×10^3	1.38×10^3 *3*	0.0	19.3 *19*	6513
1.5×10^2	0.0	7.4	5309	1.51×10^3 *3*	0.0	15.5 *31*	6707
1.5×10^2	4283.56		9.58×10^3	1.72×10^3 *3*	0.0	2.1 *6*	6924
3.0×10^2 *5*	3831.96	0.41 *8*	9.28×10^3	1.87×10^3 *4*	0.0	12.0 *23*	7070
4.4×10^2 *2*	0.0	13.5 *29*	5587.7	2.09×10^3 *5*	0.0	3.7 *8*	7335
5.7×10^2 *2*	0.0	10.2 *23*	5722	2.21×10^3 *5*	0.0	1.9 *6*	7428
6.0×10^2 *6*	3831.96	0.15 *4*	9.58×10^3	2.37×10^3 *6*	0.0	0.62 *14*	7612
6.6×10^2	4283.56		10.10×10^3	2.58×10^3 *7*	0.0	0.79 *16*	7872
1.03×10^3 *13*	3831.96	0.058 *20*	10.10×10^4	2.94×10^3 *7*	0.0	0.64 *14*	8.14×10^3
1.17×10^3 *2*	0.0	9.9 *19*	6.33×10^3	3.18×10^3 *8*	0.0	1.2 *27*	8.39×10^3
1.21×10^3 *3*	0.0	9.9 *19*	6376	3.46×10^3 *9*	0.0	0.43 *14*	8.67×10^3

† From 1983RaZR.
‡ Deduced from relative intensities in 1983RaZR and assumption that ΣI(n)=100, except as noted.
# From Adopted Levels.
@ For absolute intensity per 100 decays, multiply by 0.86 *9*.

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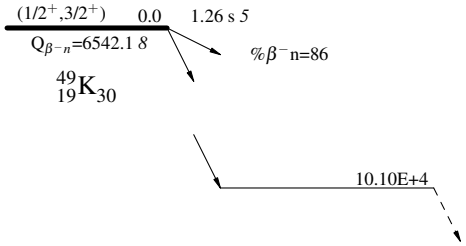
Decay Scheme

γ Intensities: Relative I_γ
I(n) Intensities: Relative I(n)

Legend
γ Decay (Uncertain)
Coincidence



E(n)	I(n)	$E(^{49}_{20}Ca)$	$E(^{48}_{20}Ca)$
150	6.4	5309	0.0
440	12	5587.7	0.0
570	8.8	5722	0.0
1.17×10^3	8.5	6.33×10^3	0.0
1.21×10^3	8.5	6376	0.0
1.38×10^3	16.6	6513	0.0
1.51×10^3	13	6707	0.0
1.72×10^3	1.8	6924	0.0
1.87×10^3	10.3	7070	0.0
2.09×10^3	3.2	7335	0.0
2.21×10^3	1.6	7428	0.0
2.37×10^3	0.53	7612	0.0
2.58×10^3	0.68	7872	0.0
2.94×10^3	0.55	8.14×10^3	0.0
3.18×10^3	1.0	8.39×10^3	0.0
3.46×10^3	0.37	8.67×10^3	0.0
120	0.172	9.10×10^3	3831.96
300	0.35	9.28×10^3	3831.96
600	0.13	9.58×10^3	3831.96
1.03×10^3	0.050	10.10×10^4	3831.96
150		9.58×10^3	4283.56
660		10.10×10^3	4283.56