^{47}Ar β^- decay: tentative 2004We09

	History		
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. W. Burrows	NDS 108, 923 (2007)	20-Feb-2007

Parent: ^{47}Ar: E=0.0; J$^\pi$=(3/2$^-$); $T_{1/2}$=1.23 s *3*; Q(β^-)=9.79×10^3 *10*; %β^- decay=100.0
^{47}Ar-E,J$^\pi$,$T_{1/2}$: From the Adopted Levels for ^{47}Ar. 2004We09 assumed a configuration of $(sd)^{22}(f_{7/2})^8(f_{5/2},p_{3/2},p_{1/2})$.
^{47}Ar-Q(β^-): From 2003Au03.
^{47}Ar-%β^- decay: %β^-n<0.2 (2004We09).
Produced by a pulsed beam of 1.4 GeV protons (3×10^{13} protons/pulse) from the PSB accelerator impinging on a standard ISOLDE uranium carbide graphite target, heated to about 1900° C. The reaction products diffused from the heated target and effused *via* a low-temperature, water-cooled transfer line to a standard FEBIAD MK-7 plasma ion source, where the ionization by plasma discharge took place. A tungsten converter was placed parallel to the target, allowing one to switch to the neutron irradiation of the target by changing the focus of the proton beam from the target to the converter. Measured Eγ, Eβ, Iγ, Iβ, $\gamma\gamma$- and $\beta\gamma$-coin, and $T_{1/2}$ using two Ge detectors and four 1.5-mm thick plastic detectors (for detecting β^-'s).
The level scheme is tentative As stated by 2004We09. The position of first two excited states and their transitions were known from ^{48}Ca(^{48}Ca,Xγ). 1742γ and 3822γ placed according to coincidence relations. The relatively strong 3718 is not observed In coincidence with other γ's and, therefore, assumed to deexcite the 3718 state. 2020γ, 3420γ, and 3357γ placed solely on their energies.

^{47}K Levels

2004We09 adopt the following configurations for excited states In ^{47}K: $(sd)^{23}(f_{7/2})^8$ and $(sd)^{23}(f_{7/2})^7(f_{5/2},p_{3/2},p_{1/2})$ for positive-parity states, and $(sd)^{22}(f_{7/2})^8(f_{5/2},p_{3/2},p_{1/2})$ and $(sd)^{22}$ $(f_{7/2})^9$ for negative-parity states.

E(level)†	J$^\pi$‡	$T_{1/2}$	Comments
0.0	1/2$^+$	17.50 s *24*	%β^-=100 J$^\pi$,$T_{1/2}$,%β^-: from the Adopted Levels.
360.0 *10*	3/2$^+$		J$^\pi$: from the Adopted Levels.
2020.0 *15*	(7/2$^-$)		
3717.6? *7*	(3/2$^-$)		
3762.1 *18*	(5/2$^-$)		
5842.4 *18*	(5/2$^-$)		

† From least-squares fit to Eγ's assuming ΔE(γ)=1 keV (evaluators).
‡ From comparison of experimental to calculated decay patterns (2004We09), except As noted.

β^- radiations

log *ft*(α) 2004We09 quote 7.9; which correspond to incorrectly assumed first-forbidden unique transition As stated by 2004WeZY.
log *ft*(β) too low for ΔJ=^{2,}Notransition. Feeding considered As questionable by the evaluator.

E(decay)	E(level)	Iβ^-†#	Log *ft*	Comments
(3.95×10^3 *10*)	5842.4	3 *1*	5.0 *2*	av Eβ=1758 *49*
(6.03×10^3 *10*)	3762.1	26 *3*	4.9 *1*	av Eβ=2774 *49*
(6.07×10^3@ *10*)	3717.6?	9 *2*	5.4 *1*	av Eβ=2796 *49*
(7.77×10^3@ *10*)	2020.0	7 *3*	6.0 *2*	av Eβ=3630 *50*
(9.43×10^3 *10*)	360.0	24 *4*	5.9 *1*	av Eβ=4446 *50*
(9.79×10^3 *10*)	0.0	26‡ *8*	5.9 *2*	av Eβ=4623 *50*

Continued on next page (footnotes at end of table)

^{47}Ar β^- decay: tentative 2004We09 (continued)

β^- radiations (continued)

† All branching ratios are normalized based on the total decay strength deduced from intensities of the γ's from ^{47}K decay. (relative Iγ(586γ)=147 *16* and Iγ(2013γ)=155 *15* from ^{47}K decay As measured by 2004We09 without tape MOVEMENT.).

‡ Observed ^{47}K activity corresponds to the buildup of the ^{47}Ar daughter. Therefore, intensities of the 586γ and 2013 γ of ^{47}K represent 79% and 93% of the total ^{47}Ar decay flux, respectively. The total strength of ^{47}Ar decay measured In these γ's is 174 *13* In the same relative units As given for the ^{47}Ar decay γ's. This value should Be compared to the Σ Iγ(to g.s.), 128 *3*. Undetected decay to the g.s. is assumed to Be responsible for the rest of the decay strength, 46 *13*, which corresponds to a 26% 8 decay branching to the g.s..

Absolute intensity per 100 decays.

@ Existence of this branch is questionable.

γ(^{47}K)

Iγ normalization: from Σ Ti(to g.s.)=74 *8* (evaluator).

E_γ	I_γ[c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[†]	Comments
360[‡#@]	100	360.0	3/2+	0.0	1/2+	(M1,E2)	0.0011 *7*	α=0.0011 *7*; α(K)=0.0010 *6*; α(L)=9.E−5 *5*; α(M)=1.0×10^{-5} *6*; α(N+..)=3.5×10^{-7} *20*
1660[‡#]	53 *5*	2020.0	(7/2−)	360.0	3/2+	(M2)	9.12×10^{-5} *13*	α=9.12×10^{-5} *13*; α(K)=3.70×10^{-5} *6*; α(L)=3.10×10^{-6} *5*; α(M)=3.37×10^{-7} *5*; α(N+..)=5.08×10^{-5} *8* α(N)=1.242×10^{-8} *18*; α(IPF)=5.07×10^{-5} *8*
1742[#&]	41 *4*	3762.1	(5/2−)	2020.0	(7/2−)			
2020[#ad]	7 *1*	2020.0	(7/2−)	0.0	1/2+	[E3]	0.000206 *3*	α=0.000206 *3*; α(K)=2.61×10^{-5} *4*; α(L)=2.19×10^{-6} *3*; α(M)=2.38×10^{-7} *4*; α(N+..)=0.0001779 *25* α(N)=8.76×10^{-9} *13*; α(IPF)=0.0001779 *25*
[x]3207[#]	3 *1*							
[x]3316	1 *1*							
3357[ad]	1 *1*	3717.6?	(3/2−)	360.0	3/2+			
3402[#ad]	4 *2*	3762.1	(5/2−)	360.0	3/2+			
3718[#bd]	14 *2*	3717.6?	(3/2−)	0.0	1/2+			
3822[#&]	6 *1*	5842.4	(5/2−)	2020.0	(7/2−)			
[x]4010	3 *1*							

† From the Adopted Gammas.

‡ Placement based on ^{48}Ca(^{48}Ca,Xγ) study (2001Br35).

Transition not observed In neutron-converter spectrum.

@ Transition contaminated In the neutron-converter spectrum by 359 and 362 γ's In ^{94}Kr and ^{141}Xe, respectively.

& Placement based on observed coincidences.

a Tentative placement based on on the energy.

b Relatively strong γ not In coincidence with any other γ.

c For absolute intensity per 100 decays, multiply by 0.70 *12*.

d Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

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Decay Scheme

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