^{38}K ε decay (7.651 min) 1976Ma14,1968Ka15

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 152, 1 (2018)	30-Sep-2017

Parent: ^{38}K: E=0; $J^\pi=3^+$; $T_{1/2}$=7.651 min *19*; Q(ε)=5914.07 *4*; %ε+%β^+ decay=100.0

^{38}K-J^π,$T_{1/2}$: From Adopted Levels of ^{38}K.

^{38}K-$T_{1/2}$: Additional information 1.

^{38}K-Q(ε): From 2017Wa10.

1976Ma14: ^{38}K source was produced via ^{35}Cl(α,n) reaction with α beam provided by the ONR-CIT tandem impinged on $BaCl_2$ target. γ rays were detected with a Ge(Li) detector. Measured Eγ, Iγ. Deduced levels, β-decay branching ratios, log *ft*. Comparisons with available data.

1968Ka15: ^{38}K source was produced via ^{36}Ar(^{3}He,n) reaction with α beam provided by the 5.5-MV Van de Graaff at Strasbourg impinged on a gas target of >99.9% enriched ^{36}Ar. γ rays were detected with a Ge(Li) detector. Measured Eγ, Iγ, γ(t). Deduced levels, β-decay branching ratios, parent $T_{1/2}$.

1974Fa08: measured $\beta\gamma$(circ pol).

1970Re13, 1967Va27, 1965Eb01, 1964Ph02: measured half-life.

1965h02: hyperfine structure, NMR.

1956Gr07: measured β^+, $T_{1/2}$.

Others: Nucl. Phys. 41, 364 (1963); 1960Ja12; Phys. Rev. 84, 847 (1951); Phys. Rev. 72, 639 (1947); 1937Ri01; 1937Hu01.

Additional information 2.

Total decay energy deposit of 5918 keV *2* calculated by RADLIST code is in agreement with the expected value of 5914.07 keV *5* indicating the completeness of the decay scheme.

^{38}Ar Levels

E(level)[†]	J^π[‡]
0	0^+
2167.6 *3*	2^+
3810.224? *18*	3^-
3935.8 *5*	2^+
4565.5?[#]	2^+
5157.3?[#]	2^+
5349.4?[#]	4^+
5552.2?[#]	$1^+,2^+$

[†] From a least-squares fit to γ-ray energies.
[‡] From Adopted Levels.
[#] Rounded values from Adopted Levels.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ [‡]	Iε[‡]	Log *ft*	I($\varepsilon+\beta^+$)[‡]	Comments
(361.87[#] *4*)	5552.2?		<0.025	>4.3	<0.025[†]	εK=0.8988; εL=0.08823; εM+=0.01295
(564.67[#] *4*)	5349.4?		<0.025	>4.6	<0.025[†]	εK=0.8993; εL=0.08778; εM+=0.01287
(756.77[#] *4*)	5157.3?		<0.02	>5.0	<0.02[†]	εK=0.8996; εL=0.08757; εM+=0.01284
(1348.57[#] *4*)	4565.5?	<0.025	<0.13	>4.7	<0.15[†]	av Eβ=133.62 *12*; εK=0.7514 *4*; εL=0.07290 *4*; εM+=0.010685 *6*
(1978.3 *5*)	3935.8	0.134 *9*	0.0178 *12*	5.88 *3*	0.152 *10*	av Eβ=398.86 *26*; εK=0.10511 *18*; εL=0.010184 *18*; εM+=0.001492 *3* I($\varepsilon+\beta^+$): weighted average of 0.141 *5* (1976Ma14),

Continued on next page (footnotes at end of table)

^{38}K ε decay (7.651 min) 1976Ma14,1968Ka15 (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)‡	Comments
						0.20 *3* (1968Ka15) and 0.165 *6* as quoted in 1978En02 evaluation from private communication of the evaluator of 1978En02 with Van der Poel and Engelbertink from Utrecht University (this work in 1976 was unpublished). Only 1968Ka15 explicitly state that the β+ branching was calculated assuming the 3936 level decays only to the ground state. The evaluator assume that the same assumption also applies in the calculations of other two values.
(2103.85# *4*)	3810.224?	<0.0092	<0.00082	>7.3	<0.010	av Eβ=454.00 *13*; εK=0.07366 *6*; εL=0.007136 *6*; εM+=0.0010457 *9*
(3746.5 *3*)	2167.6	99.332 *11*	0.516 *5*	4.975 *1*	99.848 *10*	av Eβ=1212.03 *20*; εK=0.004650 *3*; εL=0.0004499 *2*; εM+=6.593×10^{-5} *3* I(ε+β+): from 100-I(ε+β+ to 3936). Others: 99.9 *1* (1976Ma14), 99.80 *3* (1968Ka15). E(decay): β+ end-point energy measurement: 2600 *50* (1967Va27), 2680 *30* (1956Gr07).
(5914.07# *4*)	0	<0.1	<0.0003	>12.8^{2u}	<0.1	av Eβ=2292.81; εK=0.0031447 *7*; εL=0.0003047; εM+=4.4659×10^{-5} *9*

† Limits from 1976Ma14.
‡ Absolute intensity per 100 decays.
# Existence of this branch is questionable.

γ(^{38}Ar)

Eγ†	Iγ‡@	Ei(level)	J_i^π	Ef	J_f^π	Mult.#	Comments
1770	≈0.01	3935.8	2+	2167.6	2+		Eγ: rounded value from Adopted Gammas. Iγ: estimated by the evaluator from the value of 0.0106 *9* deduced based on Iγ(3935.6γ)=0.152 *10* and adopted Iγ(1769γ)/Iγ(3935.6γ)=7.0 *4*/100.0 *4*. This γ ray is too weak to be seen in 1976Ma14 and 1968Ka15.
2167.5 *3*	99.848 *10*	2167.6	2+	0	0+	E2	
3935.6 *5*	0.152 *10*	3935.8	2+	0	0+		

† From 1968Ka15, unless otherwise stated.
‡ From ε+β+ branchings, unless otherwise noted.
# From Adopted Gammas.
@ Absolute intensity per 100 decays.

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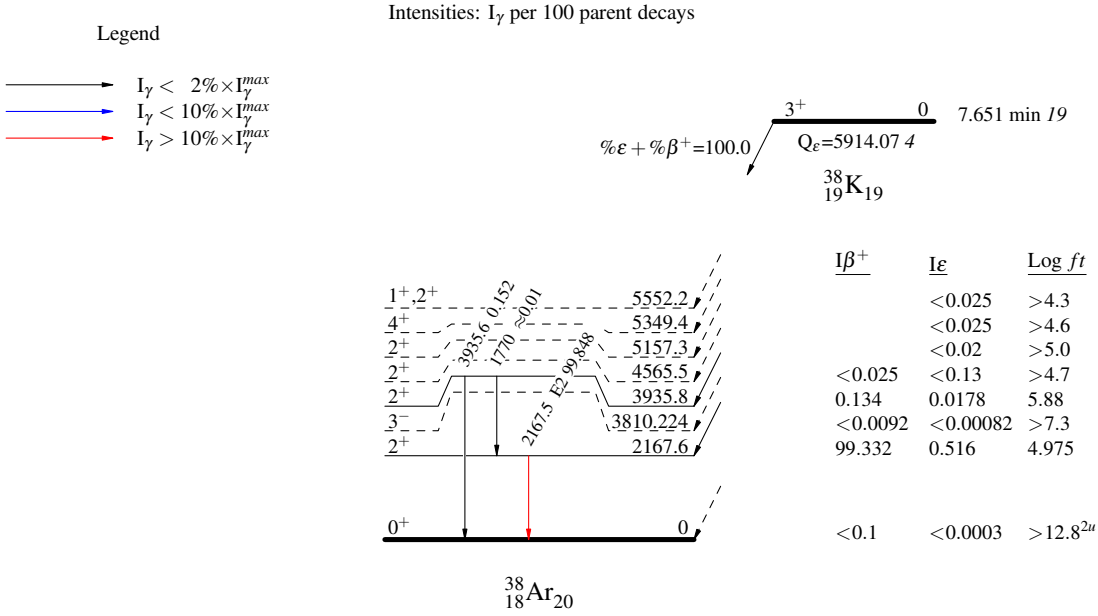
Decay Scheme

Intensities: I_γ per 100 parent decays



	Iβ+	Iε	Log *ft*
		<0.025	>4.3
		<0.025	>4.6
		<0.02	>5.0
	<0.025	<0.13	>4.7
	0.134	0.0178	5.88
	<0.0092	<0.00082	>7.3
	99.332	0.516	4.975
	<0.1	<0.0003	>12.8[2u]