^{38}S β^- decay (170.3 min) 1986Wa22,1972Vi11,1971En01

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

Parent: ^{38}S: E=0; $J^\pi=0^+$; $T_{1/2}$=170.3 min *7*; Q(β^-)=2937 *7*; %β^- decay=100.0

^{38}S-$T_{1/2}$: weighted average of 172 min *1* (1958Ne10), 169.6 min *7* (1971En01), and 170.0 min *8* (1972Vi11); the same value is adopted in Adopted Levels of ^{38}S.

^{38}S-Q(β^-): From 2017Wa10.

1986Wa22: ^{38}S source ions were produced by bombardment of 81% enriched ^{36}S by 3.1 MeV triton beam. γ rays were detected with a Compton suppression spectrometer (CSS) consisting of a NaI(Tl) annulus and an intrinsic coaxial Ge detector. Measured Eγ, Iγ. Deduced levels, J, π, decay branching ratios. Comparisons with available data and shell-model calculations.

1972Vi11: ^{38}S source was produced via ^{40}Ar(γ,2p). γ rays were detected with Ge(Li) detectors. Measured Eγ, Iγ, γ(t). Deduced levels, parent $T_{1/2}$.

1971En01: ^{38}S source was produced by bombarding Ag_2S targets with 3.26 MeV tritons provided by the BNL 3.5-MV Van de Graaff. γ rays were detected with Ge(Li) and NaI(Tl) detectors and β particles were detected with a surface-barrier detector. Measured Eγ, Iγ, Eβ, Iβ, $\gamma\gamma$-coin, $\beta\gamma$-coin, γ(t). Deduced levels, J, π, decay branching ratios, parent $T_{1/2}$.

1958Ne10: measured Eγ, Iγ, $T_{1/2}$, Eβ, $\gamma\gamma$, $\beta\gamma$ coin.

Total decay energy deposit of 2936 keV *58* calculated by RADLIST code is in agreement with the expected value of 2937 keV *7* (2017Wa10), indicating the completeness of the decay scheme.

^{38}Cl Levels

E(level)[‡#]	J^π[†]	Comments
0.0	2^-	
755.431 *11*	3^-	E(level): from Adopted Levels.
1692.68 *8*	$(1,2)^-$	
1745.81 *4*	$0^-,1^-$	
1941.998 *14*	1^+	
2751.09 *7*	1^+	

† From Adopted Levels.

‡ From a least-squares fit to γ-ray energies, unless otherwise noted.

Additional information 1.

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(186 *7*)	2751.09	1.44 *6*	4.13 *6*	av Eβ=54.9 *24*
(995 *7*)	1941.998	86.6 *19*	4.95 *2*	av Eβ=372.7 *31* Iβ^-: others: 83.4 *30* from 1986Wa22 and 83 *2* from 1971En01.
(1191 *7*)	1745.81	2.46 *10*	6.80 *2*	av Eβ=458.5 *31*
(1244 *7*)	1692.68	0.188 *18*	8.00 *5*	av Eβ=482.1 *32*
(2937 *7*)	0.0	9.3 *20*	9.25[1u] *10*	av Eβ=1291.2 *34* Iβ^-: deduced by the evaluator based on ^{38}S-^{38}Cl sequential decay in equilibrium using measured intensity of 2167γ in ^{38}Ar from ^{38}Cl decay and total γ feedings to g.s. in ^{38}Cl from ^{38}S decay in 1986Wa22, adopted Iβ(g.s.)=56.0% *6* for ^{38}Cl to ^{38}Ar decay, and adopted halflives of ^{38}S and ^{38}Cl. Other: 12.7 *32* deduced by 1986Wa22 and 14.2 *20* by 1971En01 based on Iβ(g.s.)=57.6% *13* from 1968Va06 for ^{38}Cl to ^{38}Ar decay.

† Deduced from Iγ intensity imbalance at each level for excited states.

‡ Absolute intensity per 100 decays.

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$\gamma(^{38}Cl)$

Iγ normalization: From Σ(Iγ to g.s.)=90.7 *20*, based on 9.3 *20* β^- feeding to g.s. (see comments for Iβ(g.s.)).

E_γ †	I_γ †@	E_i(level)	J_i^π	E_f	J_f^π	Comments
196.19	0.10 *3*	1941.998	1^+	1745.81	$0^-,1^-$	%Iγ=0.09 *3* E_γ: from level-energy difference.
755.425‡ *11*	0.017# *3*	755.431	3^-	0.0	2^-	%Iγ=0.015 *3*
936.9‡ *3*	0.017# *3*	1692.68	$(1,2)^-$	755.431	3^-	%Iγ=0.015 *3*
1692.64 *8*	0.20 *2*	1692.68	$(1,2)^-$	0.0	2^-	%Iγ=0.173 *18*
1745.77 *4*	2.94 *9*	1745.81	$0^-,1^-$	0.0	2^-	%Iγ=2.54 *10* E_γ: other: 1746.2 *4* from 1971En01.
1941.945 *14*	100.0	1941.998	1^+	0.0	2^-	%Iγ=86.5 *20* E_γ: other: 1941.7 *2* from 1971En01.
2750.98 *7*	1.66 *6*	2751.09	1^+	0.0	2^-	%Iγ=1.44 *6*

† From 1986Wa22, unless otherwise noted. Intensities in 1986Wa22 are taken by authors from weighted averages of measured values in 1986Wa22, 1972Vi11 and 1971En01; the quoted values here are the original values from 1986Wa22 divided by 100.

‡ From Adopted Gammas, γ intensity is below the detection threshold in studies of 1986Wa22 and 1972Vi11. Eγ not used in least-squares fitting procedure.

Values are obtained by scaling Iγ(1692.64)=0.20 *2* using Iγ(936.9γ)/Iγ(1692.64γ)=8.3 *14*/100.0 *24* in Adopted Gammas.

@ For absolute intensity per 100 decays, multiply by 0.865 *20*.

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Decay Scheme

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