^{140}Sb β^- decay 2017Mo12

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 154, 1 (2018)	20-Nov-2018

Parent: ^{140}Sb: E=0.0; J^π=(3$^-$,4$^-$); $T_{1/2}$=173 ms *12*; Q(β^-)=12640 *SY*; %β^- decay=100.0

^{140}Sb-E,J^π,$T_{1/2}$: From 2017Mo12.

^{140}Sb-Q(β^-): 12640 *600* (syst,2017Wa10).

2017Mo12 compiled for XUNDL compilation by B. Singh (McMaster).

2017Mo12: ^{140}Sb produced in ^{9}Be(^{238}U,F), E(^{238}U)=345 MeV per nucleon using BigRIPS spectrometer at RIBF-RIKEN facility. Measured reaction products using WAS3ABi system of Si detectors, Eγ, Iγ, $\gamma\gamma$-coin, β, %β^-n and %β^-2n and half-life of ^{140}Sb decay using EURICA HPGe cluster array. 2017Mo12 report the first measurement of half-life of ^{140}Sb decay.

All data and decay scheme is from 2017Mo12 unless noted otherwise.

Decay scheme is incomplete.

^{140}Te Levels

E(level)	J^π	Comments
0.0	0$^+$	
422.9 *3*	(2$^+$)†	
848.2 *3*	(4$^+$)†	
4440+x		E(level): x<Q(β^-)−S(n)(^{140}Te) or x<8200 *600*, where Q(β^-)=12640 *600* and S(n)=4440 *60*, both from 2017Wa10.
7020+y		E(level): y<Q(β^-)−S(2n)(^{140}Te) or x<5620 *600*, where Q(β^-)=12640 *600* and S(2n)=7020 *60*, both from 2017Wa10.

† Assigned by 2017Mo12 as most likely populated by the β^- decay.

β^- radiations

2017Mo12 found no evidence for β feeding to the g.s. of ^{140}Te from a comparison of the number of implants and the associated $\beta\gamma$-coin events.

E(decay)	E(level)	Iβ^-†‡	Log *ft*†	Comments
(2810$^\#$ *SY*)	7020+y	7.6 *10*		Iβ^-: from %β^-2n=7.6 *10* (2017Mo12), treated as a lower limit.
(4100$^\#$ *SY*)	4440+x	23 *4*		Iβ^-: from %β^-n=23 *4* (2017Mo12), treated as a lower limit.
(11791 *SY*)	848.2	14 *4*	6.02 *16*	
(12217 *SY*)	422.9	17 *3*	6.03 *13*	

† From 2017Mo12. The decay scheme normalization procedure is not clearly stated in 2017Mo12.

‡ Absolute intensity per 100 decays.

$^\#$ Estimated for a range of levels.

γ(^{140}Te)

Iγ normalization: From equating Iβ=14% *4* with Iγ(425.3γ)=45 *12* (both values from 2017Mo12), although it is not clear how the Iβ feedings given in Table I of 2017Mo12 were determined from Iγ values and 3701 *71*, the total number of detected β rays (from β-decay curve of ^{140}Sb ions). Note that total β feeding including the unbound stated adds to 62% *7*, and total β feeding to the bound states adds to 31% *5*.

Continued on next page (footnotes at end of table)

^{140}Sb β^- decay 2017Mo12 (continued)

$\gamma(^{140}Te)$ (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[‡]	Comments
422.9 *3*	100 *16*	422.9	(2^+)	0.0	0^+	[E2]	0.01325	I_γ: absolute intensity=31 *5*, according to 2017Mo12.
425.3 *3*	45 *12*	848.2	(4^+)	422.9	(2^+)	[E2]	0.01303	I_γ: absolute intensity=14 *4*, according to 2017Mo12.
[x]428.2								E_γ: γ in ^{140}Te or ^{139}Te.

[†] For absolute intensity per 100 decays, multiply by 0.31.
[‡] 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.
[x] γ ray not placed in level scheme.

^{140}Sb β^- decay 2017Mo12

Decay Scheme

Intensities: Relative I_γ