^{50}V β^- decay (2.65×10^{17} y):? 2019La09,2011Do08,1989Si07

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 157, 1 (2019)	15-Apr-2019

Parent: ^{50}V: E=0.0; $J^\pi=6^+$; $T_{1/2}=2.65\times10^{17}$ y *+16−18*; Q(β^-)=1038.06 *30*; %β^- decay=0.7 *7*

^{50}V-J^π,$T_{1/2}$: From ^{50}V Adopted Levels.

^{50}V-Q(β^-): From 2017Wa10.

^{50}V-%β^- decay: From ^{50}V Adopted Levels.

2019La09: ^{50}V sample was produced from vanadium flakes by multifold electron beam melting (EBM) at the Gran Sasso Underground Laboratory (LNGS). γ rays were detected with ultra-low background high purity germanium (ULB-HPGe) detectors. Measured activities. Deduced parent partial half-life. Only the 1554γ in ^{50}Ti was observed with no evidence for 783γ in ^{50}Cr.

2011Do08: natural 255.82 g ^{50}V sample measured for 97.8 d (total detector mass measuring time product=185.8 kg.d). Ultralow background Ge-detector (ULB detector) at the underground laboratory for dosimetry and spectrometry of the PTB in Germany. Detector calibrated with solutions of know activity provided by PTB. Results corrected for contaminations from ^{238}U and ^{232}Th, mass of water (determined at PTB) and oxygen (determined at German Federal Institute for Materials Research) in sample resulting from exposure to air subtracted when calculating activity concentration. Measured partial half-life of ^{50}V ε decay. Only the 1554γ in ^{50}Ti was observed with no evidence for 783γ in ^{50}Cr.

1989Si07: measured 1554γ and deduced $T_{1/2}(\varepsilon)$; three large Ge detectors in a salt mine; 337.5 g of natural V, 1109 h and a background run of 4206 h; corrections were made for Th and U contaminants. Authors claimed to have observed 783γ in ^{50}Cr from the first 2^+ state of ^{50}Cr.

1985Si02 (same group as 1989Si07): measured 1554γ and deduced $T_{1/2}(\varepsilon)$; intrinsic Ge; 100.6 g of natural V, 193.3 h and background run of 100 d; correction for U contaminants.

1984Al10: measured 1554γ and deduced $T_{1/2}(\varepsilon)$; Ge(HP); 4250 g of natural V, 135.5 d. No 783γ from β^- decay was observed.

^{50}Cr Levels

E(level)	J^π	Comments
0.0?	0^+	
783.3?	2^+	E(level),J^π: From the Adopted Levels. Energy is rounded value.

β^- radiations

E(decay)	E(level)	Iβ^-[†]	Log *ft*	Comments
(254.8[‡] *3*)	783.3?	0.7 *7*	>25.6	av Eβ=75.53 *10* Iβ^-: from %ε>98.6 (2019La09). Others: 3.5 *25* from %ε>92.9 (2011Do08), 17% *11* (1989Si07). Log *ft*: for allowed decay.

[†] Absolute intensity per 100 decays.

[‡] Existence of this branch is questionable.

$\gamma(^{50}Cr)$

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
783.3[†]	783.3?	2^+	0.0?	0^+	E_γ: Rounded value from the Adopted Gammas. Observation of this γ was claimed only by 1989Si07 in a complex γ-ray spectrum shown in their Fig. 2. This γ was not seen by 2019La09, 2011Do08 or 1984Al10.

[†] Placement of transition in the level scheme is uncertain.

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Decay Scheme