Adopted Levels

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	15-Sep-2023

Q(β^-)=21690 *syst*; S(n)=1920 *syst*; S(p)=19710 *calc*; Q(α)=−18230 *calc* 2021Wa16,2019Mo01

Estimated uncertainties (2021Wa16): 720 for Q(β^-), 850 for S(n).

S(p) and Q(α) from 2019Mo01. Q(β^-) and S(n) from 2021Wa16.

S(2n)=2480 *780*, Q(β^-n)=19570 *650* (syst, 2021Wa16). S(2p)=44990 (2019Mo01, theory). Q(β^-2n)=16640 *620*, Q(β^-3n)=15080 *600*, Q(β^-4n)=11240 *600*, Q(β^-5n)=8040 *600*, Q(β^-6n)=2040 *600* (syst, deduced by evaluator from relevant mass excesses in 2021Wa16).

2018Ta17: ^{57}K formed by fragmentation of $^{70}Zn^{30+}$ beam at 345 MeV/nucleon from RIKEN-RIBF accelerator complex. Rotating target of ^{9}Be of 15 mm thickness were located at the BigRIPS two-stage ion separator. Particle identification (PID) was achieved by measuring time of flight (TOF), energy loss (ΔE), total kinetic energy (TKE), and magnetic rigidity (Bρ) through event by event analysis of reaction products. Particles of interest were stopped in a 76-mm thick CsI crystal after passing through six 1-mm thick silicon p-i-n diodes, while the magnetic rigidity (Bρ) of the fragments was reconstructed from position and angle measurements at foci using two sets of position-sensitive parallel plate avalanche counters (PPACs). Optimization was done using LISE^{++} simulation code. A total of eight events were assigned to ^{57}K.

No references in the NSR database for theoretical structure calculations.

Additional information 1.

^{57}K Levels

E(level)	Comments
0	%β^-=100; %β^-n=?; %β^-2n=?; %β^-3n=?; %β^-4n=? %β^-5n=?; %β^-6n=? Only the β^- decay mode is expected, followed by delayed neutron decays, thus 100% β^- decay is assigned by inference. A total of eight events were assigned to ^{57}K, as in the text of 2018Ta17. In Table I of the paper, six events are assigned for tuned setting of the spectrometer for ^{60}Ca, and one event for setting on ^{57}K. Theoretical $T_{1/2}(\beta)$=5.6 ms, %β^-n=69, %β^-2n=24, %β^-3n=5, %β^-4n=0, %β^-5n=0, %β^-6n=0 (2019Mo01). Theoretical $T_{1/2}(\beta)$=5.6 ms, %β^-n=41.2, 45.9; %β^-2n=43.2, 37.8; %β^-3n=4.3, 3.8; %β^-4n=0.41, 0.49; %β^-5n=0.010, 0.004; %β^-6n=0 (2021Mi17); two values for different fission barriers. The observed events are assumed to correspond to the ^{57}K g.s. $T_{1/2}$: half-life of the ^{57}K activity has not been measured. It is expected to be greater than the time-of-flight through the beam transport system, which may be about 500 ns. From systematics of half-lives of neighboring P isotopes, the half-life is expected to be <10 ms from 10 ms for ^{54}K, 30 ms for ^{53}K, 110 ms for ^{52}K, and 365 ms for ^{51}K, assuming a decreasing trend of half-life as neutron number increases in neutron-rich nuclei. From systematics, $T_{1/2}$=2 ms in 2021Ko07. J$^{\pi}$: 1/2$^+$ (2019Mo01, theory); 3/2$^+$ (syst, 2021Ko07).