Adopted Levels

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	25-Mar-2019

Q(β^-)=17280 *SY*; S(n)=3090 *SY*; S(p)=18780 *CA*; Q(α)=−17560 *CA* 2017Wa10,1997Mo25

Estimated uncertainties (2017Wa10): 720 for Q(β^-), 780 for S(n).

Q(β^-) and S(n) from 2017Wa10, S(p) and Q(α) from 1997Mo25.

Q(β^-n)=15190 *670*, S(2n)=4910 *720* (syst,2017Wa10). S(2p)=42610 (theoretical,1997Mo25). Q(β^-2n)=10300 *630*, Q(β^-3n)=7830 *630* and Q(β^-4n)=2570 *650*, deduced by evaluator from mass excesses in 2017Wa10.

2009Ta24, 2009Ta05: ^{61}Sc identified by fragmentation of ^{76}Ge beam at 132 MeV/nucleon at NSCL facility using A1900 fragment separator combined with S800 analysis beam line to form a two stage separator system. The transmitted fragments were analyzed event-by-event in momentum and particle identification. The nuclei of interest were stopped in eight Si diodes which provided measurement of energy loss, nuclear charge and total kinetic energy. The time-of-flight of each particle that reached the detector stack was measured in four different ways using plastic scintillators, Si detectors, and parallel-plate avalanche counters. The simultaneous measurement of ΔE signals, the magnetic rigidity, total kinetic energy and the time-of-flight (TOF) provided unambiguous identification of the atomic number, charge state and mass number.

1995Ri05: shell model calculations; predicted spin, binding energy, and mass defect.

Theory references: consult the NSR database (www.nndc.bnl.gov/nsr/) for six references for structure calculations.

^{61}Sc Levels

E(level)	Comments
0	%β^-=100; %β^-n=?; %β^-2n=?; %β^-3n=?; %β^-4n=? β^- is the only possible decay mode, followed by β-delayed neutron emissions, thus 100% β^- decay is assigned by inference, although, no radiation from the decay of ^{61}Sc has yet been observed. Theoretical $T_{1/2}$=5.4 ms, %β^-n=46.1, %β^-2n=1.3, %β^-3n=2.3, %β^-4n=0.0 (2003Mo09). Theoretical $T_{1/2}$=8.1 ms, %β^-n=94.4, %β^-2n=1.4, %β^-3n=1.0 (2016Ma12). Measured cross section=8 fb *+14−5* for Be target and 74 fb *+133−56* for W target (data supplied by O. Tarasov in e-mail reply of Nov 11, 2009, corresponding to Fig. 2 in 2009Ta05 and Fig. 8 in 2009Ta24). E(level): fragments observed by 2009Ta05 and 2009Ta24 are assumed to be in the ground state of ^{61}Sc. J$^\pi$: 7/2 predicted by 1997Mo25 and 1995Ri05, and 7/2$^-$ from systematics (2017Au03). $T_{1/2}$: half-life of the decay of ^{61}Sc has not yet been measured. $T_{1/2}$>650 ns from time-of-flight of 620-650 ns, given in e-mail reply of Sept 23, 2009 from O. Tarasov. From a general decreasing trend of half-lives with increasing neutron number, $T_{1/2}$ for ^{61}Sc g.s. is expected to be <10 ms, based on measured half-lives of 12 ms for ^{58}Sc, 22 ms for ^{57}Sc, 26 ms *6* for ^{56}Sc, and 96 ms for ^{55}Sc available in the ENSDF and/or XUNDL database (as of March 25, 2019). 2017Au03 give 2 ms from systematic trend.