Adopted Levels

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 147, 382 (2018)	1-Dec-2017

Q(β^-)=6070 *SY*; S(n)=4480 *SY*; S(p)=8840 *SY*; Q(α)=1380 *CA* 2017Wa10,1997Mo25
Estimated uncertainties (2017Wa10): 500 for Q(β^-) and S(n), 570 for S(p).
Q(β^-), S(n) and S(p) from 2017Wa10, Q(α) from 1997Mo25.
Q(β^-n)=2760 *450*, S(2n)=7740 *500* (syst, 2017Wa10). S(2p)=20210 (1997Mo25, calculated).

^{217}Tl evaluated by B. Singh.

2010Al24: ^{217}Tl nuclide identified in ^{9}Be(^{238}U,X) reaction with a beam energy of 1 GeV/nucleon produced by the SIS synchrotron at GSI facility. Target=2500 mg/cm^2. The fragment residues were analyzed with the high resolving power magnetic spectrometer Fragment separator (FRS). The identification of nuclei was made on the basis of magnetic rigidity, velocity, time-of-flight, energy loss and atomic number of the fragments using two plastic scintillators and two multisampling ionization chambers. The FRS magnet was tuned to center on ^{210}Au, ^{216}Pb, ^{219}Pb, ^{227}At and ^{229}At nuclei along the central trajectory of FRS.

Unambiguous identification of nuclides required the separation of different charge states of the nuclei passing through the FRS. At 1 GeV/nucleon incident energy of ^{238}U, fraction of fully stripped ^{226}Po nuclei was about 89%. Through the measurement of difference in magnetic rigidity in the two sections of the FRS and the difference in energy loss in the two ionization chambers, the charge state of the transmitted nuclei was determined, especially, that of the singly charged (hydrogen-like) nuclei which preserved their charge in the current experimental setup. Measured production cross sections with 10% statistical and 20% systematic uncertainties.

Criterion established in 2010Al24 for acceptance of identification of a new nuclide: 1. number of events should be compatible with the corresponding mass and atomic number located in the expected range of positions at both image planes of the FRS spectrometer; 2. number of events should be compatible with >95% probability that at least one of the counts does not correspond to a charge-state contaminant. Comparisons of measured σ with model predictions using the computer codes COFRA and EPAX.

^{217}Tl Levels

E(level)	Comments
0	%β^-=100; %β^-n=? While no decay mode has been experimentally observed, evaluators assign %β^-=100 by inference, as β^- is the only decay mode energetically possible. $T_{1/2}$: no experimental value has been reported. A lower limit of 300 ns is implied from time of flight through the separator as given in 2006Ca30 for a similar setup. Half-life is expected to be <10 s, based on $T_{1/2}$=6 s *3* for ^{216}Tl, 10 s *4* for ^{215}Tl, 11 s *2* for ^{214}Tl, 24 s *4* for ^{213}Tl (all values taken from 2016Ca25), and assuming a decreasing trend of half-lives with the increase of neutron number in n-rich nuclei. Theoretical values: 1.3 s (2003Mo09), 0.2 s (2016Ma12). 2017Au03 list 1 s from systematics. Theoretical %β^-n=80.9 (2003Mo09), 19.5 (2016Ma12). Production cross section measured in 2010Al24, values are given in figure 2, plot of σ versus mass number for Tl isotopes. Statistical uncertainty=10%, systematic uncertainty=20%. Production σ=61.6 pb (from e-mail reply of Oct 29, 2010 from H. Alvarez-Pol, which also stated that further analysis was in progress). From A/Z plot (figure 1 in 2010Al24), 4 or 5 events are assigned to ^{217}Tl. E(level): the observed fragments are assumed to be in the ground state of ^{217}Tl nuclei. J^π: $J^\pi=1/2^+$ for Z=81, A=193-207 nuclei suggests $1/2^+$ for g.s. of ^{217}Tl, with $s_{1/2}$ proton orbital, $1/2^+$ in theoretical calculations (1997Mo25), and from systematics (2017Au03).