Adopted Levels

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh et al. ,	NDS 175, 1 (2021)	19-May-2021

Q(β^-)=4300 *SY*; S(n)=3080 *SY*; S(p)=10380 *SY*; Q(α)=1090 *SY* 2021Wa16

Estimated uncertainties (2021Wa16): 450 for Q(β^-), 500 for S(n), 570 for S(p) and Q(α).

S(2n)=7780 *500* (syst,2021Wa16). S(2p)=19190 (2019Mo01,theory).

Additional information 1.

2010Al24 (also 2009Al32): ^{219}Pb nuclide produced and identified in ^{9}Be(^{238}U,X),E=1 GeV/nucleon reaction at the SIS synchrotron facility of GSI. 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.

2016Ca25, 2017Ca12: ^{219}Pb produced in ^{9}Be(^{238}U,X), E=1 GeV/nucleon at GSI facility.

Theoretical calculations: eight primary references in the NSR database (www.nndc.bnl.gov/nsr) related to structure and radioactivity.

^{219}Pb Levels

E(level)	Comments
0	%β^-=100 The β^- decay is the only decay mode expected, thus 100% β^- decay mode is assigned by inference. From A/Z plot (Fig. 1 in 2010Al24), ≈35 events are assigned to ^{219}Pb. Production σ=0.502 nb (from e-mail reply of Oct 29, 2010 from H. Alvarez-Pol, which also stated that further analysis was in progress). Production cross section was measured in 2010Al24, and a plot of σ versus mass number for Pb isotopes is shown in their figure 2. Statistical uncertainty=10%, systematic uncertainty=20%. E(level): the observed fragments are assumed to be in the ground state of ^{219}Pb nuclei. J$^\pi$: from systematics of g.s. J^π values in Pb isotopes above N=128: 9/2$^+$ for ^{209}Pb and ^{211}Pb, (9/2$^+$) for ^{213}Pb. However, N=137 for ^{219}Pb may lie above the $g_{9/2}$ neutron orbital, and, depending on the deformation, may be associated with the $j_{15/2}$ neutron orbital. Others: 11/2$^+$ in 2021Ko07, 9/2$^+$ in 2017Au03, both from systematics. Ω(n)=1/2 neutron orbital in theoretical calculations (2019Mo01). $T_{1/2}$: half-life of ^{219}Pb has not been measured, but expected to be <15 s from a decreasing trend of β^- decay half-lives with increasing neutron number (measured half-lives of 15 s *7* for ^{218}Pb, 20 s *5* for ^{217}Pb and 1.65 min *2* for ^{215}Pb in 2017Ca12). From time-of-flight in separators, $T_{1/2}$>300 ns as in 2006Ca30 for a similar setup as in 2010Al24. 2021Ko07 suggest 3 s from systematic trend. Theoretical β^- decay $T_{1/2}$=16.8 s (2019Mo01).