

Adopted Levels

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, M. S. Basunia, Murray Martin et al. ,		NDS 160, 405 (2019)	30-Oct-2019

$Q(\beta^-)=2240$ SY; $S(n)=4860$ SY; $S(p)=10150$ SY; $Q(\alpha)=1850$ SY [2017Wa10](#)

Estimated uncertainties ([2017Wa10](#)): 300 for $Q(\beta^-)$, 420 for $S(n)$, 500 for $S(p)$ and $Q(\alpha)$.

$S(2n)=8170$ 360, $S(2p)=18980$ 500 (syst,[2017Wa10](#)).

[Additional information 1.](#)

[2010A124](#) (also [2009A132](#)): ^{218}Pb nuclide identified in $^9\text{Be}(^{238}\text{U},X),E=1$ GeV/nucleon. The ^{238}U beam was produced by the SIS synchrotron at GSI facility. Target= ^9Be , 2500 mg/cm² thick. 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 the 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 , the 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. Criterion stated in [2010A124](#) for acceptance of identification of a new nuclide were: 1. number of events should be compatible with the corresponding mass and atomic number located in the expected range of positions at both the image planes of the FRS spectrometer; 2. number of events should be compatible with >95% probability, that at least one of the counts did not correspond to a charge-state contaminant. Comparisons of measured σ was made with the model predictions using the COFRA and EPAX computer codes.

[2017Ca12](#), [2016Ca25](#) (also [2014Ca23](#)): ^{218}Pb produced in fragmentation of 1 GeV/nucleon ^{238}U beam from SIS-18 synchrotron at GSI on a ^9Be target of 1.6 g/cm² thickness. Reaction products were separated and identified by the GSI Fragment Separator (FRS) using $B\rho$ - ΔE - $B\rho$ technique. The FRS tracking detectors were four time-projection chambers (TPCs), two ionization chambers, and thin plastic scintillators for TOF measurement. Mass-over-charge (A/Q) ratios were measured for ions analyzed on an event-by-event basis. Finally selected ions of interest were implanted into a stack of double-sided silicon strip detectors SIMBA, which also detected the β -decay events. Comparison with theoretical calculations was made using FRDM+QRPA, DF3+cQRPA KTUY and RHB+RQRPA models. (cQRPA=continuum quasi-random-phase approximation; FRDM=finite-range droplet model; DF3=density functional theory; RHB=relativistic Hartree-Bogoliubov; RQRPA=relativistic QRPA; KTUV=Koura-Tachibana-Uno-Yamada model).

Theory references: consult NSR database (www.nndc.bnl.gov/nsr/) for 20 primary references for nuclear structure, seven for half-lives of different modes of radioactive decays, and four for nuclear reactions.

 ^{218}Pb Levels

E(level)	J^π	$T_{1/2}$	Comments
0	0^+	15 s 7	$\% \beta^- = 100$ Only the β^- decay mode is expected, and has been observed by 2017Ca12 . In A/Z plot (Fig. 1 in 2010A124), ≈ 80 events are assigned to ^{218}Pb . $T_{1/2}$: measured by 2017Ca12 and 2016Ca25 from (ion) β correlated decay curve and analyzed by maximum-likelihood method. Production cross section $\sigma=1.43$ nb 14(stat) 29(syst) measured by 2010A124 . values are given in Fig. 2 plot of σ versus mass number for Pb isotopes (also from e-mail reply of Oct 29, 2010 to B. Singh from H. Alvarez-Pol).