

Adopted Levels

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

$Q(\beta^-)=2285$  16;  $S(n)=3747$  16;  $S(p)=7820$  30;  $Q(\alpha)=5910$  50 [2021Wa16](#)

$S(2n)=9345$  17,  $S(2p)=14160$  300 (syst) ([2021Wa16](#)).

$Q(\alpha)$ :  $E\alpha=5806$  5 ([2015Fi07](#)) from  $\alpha$  decay of  $^{219}\text{Po}$ , assuming this  $\alpha$  feeds the ground state of  $^{215}\text{Pb}$ . [2021Wa16](#) assign uncertainty, assuming that the level fed by  $\alpha$  is within 50 keV.

Additional information 1.

[1998Pf02](#):  $^{219}\text{Po}$  nuclide produced and identified in  $^9\text{Be}(^{238}\text{U},X)$  reaction at  $E(^{238}\text{U})=1$  GeV/nucleon at GSI, FRS separator used to separate fragments of  $^{238}\text{U}$  beam.

[2015Fi07](#):  $^{219}\text{Po}$  produced in  $^{238}\text{U}(p,F),E=1.4$  GeV from CERN synchrotron (PS) Booster. Target=ISOLDE UC<sub>x</sub>. Pure laser-ionized beam of  $^{219}\text{Po}$  is extracted from the reaction products using a Laser-Ion Source and Trap (LIST) system, which suppresses contamination from Francium activity by more than a factor of 1000. Measured  $E\alpha$ ,  $I\alpha$ , half-life of  $^{219}\text{Po}$  activity, branching ratio for decay of  $^{219}\text{Po}$ .

Mass measurement: [2012Ch19](#) (also [2008ChZI](#) thesis): Schottky Mass Spectrometry method.

[2014Mo02](#) studied the  $\beta^-$  decay of  $^{219}\text{Bi}$  to  $^{219}\text{Po}$  and reported energies and intensities of 12  $\gamma$  rays, some observed in  $\gamma\gamma$ -coin spectra, but no decay scheme could be constructed.

Theoretical calculations: 14 primary references in the NSR database ([www.nndc.bnl.gov/nsr](http://www.nndc.bnl.gov/nsr)) related to structure and radioactivity.

 $^{219}\text{Po}$  Levels

<u>E(level)</u>	<u><math>J^\pi</math></u>	<u><math>T_{1/2}</math></u>	<u>Comments</u>
0	(9/2 <sup>+</sup> )	620 s 59	$\% \alpha=28.2$ 20 ( <a href="#">2015Fi07</a> ); $\% \beta^-=71.8$ 20 $\% \beta^-=100-\% \alpha$ . $\% \alpha$ determined by <a href="#">2015Fi07</a> by comparing the intensities of $5806\alpha$ (from $^{219}\text{Po}$ decay), and $6228\alpha$ (from the decay of $^{219}\text{At}$ daughter of $^{219}\text{Po}$ decay), together with their measured $I(6228\alpha)=93.6\%$ 10. E(level): it is assumed that the 620-s activity corresponds to the ground state of $^{219}\text{Po}$ . $T_{1/2}$ : from fitting of the decay curve for the $5806\alpha$ peak from $^{219}\text{Po}$ decay to a single exponential ( <a href="#">2015Fi07</a> ). Measured $E\alpha=5806$ 5 from the decay of $^{219}\text{Po}$ ( <a href="#">2015Fi07</a> ). $J^\pi$ : assignment proposed by <a href="#">2015Fi07</a> based on favored $\alpha$ decay to $^{215}\text{Pb}$ ground state with $J^\pi=(9/2^+)$ from systematics, and possible configuration= $\nu 2g_{9/2}$ for both the nuclides.