Adopted Levels

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	B. Singh, J. K. Tuli, E. Browne	NDS 170, 499 (2020)	8-Oct-2020

Q(β^-)=−9000 *40*; S(n)=8900 *SY*; S(p)=740 *SY*; Q(α)=8290 *SY* 2017Wa10

Estimated uncertainties (2017Wa10): ΔS(p)=300, ΔQ(α)=210. S(n) from theory (2019Mo01).

S(2p)=4130 *370*, Q(εp)=2230 *370* (syst, 2017Wa10). S(2n)=16550 (theory, 2019Mo01).

2015De22: ^{233}Bk produced and identified in deep-inelastic multinucleon transfer reaction ^{248}Cm(^{48}Ca,X),E(^{48}Ca)=270 MeV from UNILAC at GSI. Target=460 μg/cm^2 thick ^{248}Cm oxide deposited on titanium backing. Target-like products were separated using velocity filter SHIP at GSI, and implanted in position-sensitive silicon strip detector. Measured energy, position and time of the implanted nuclei, and their decay products. The α particles and SF fragments from the decay chains were detected by a set of six silicon detectors. The ^{233}Bk nuclide was identified in one decay chain of four successive α decays, the measured α energies and/or half-lives of two such decays can be roughly matched with the literature values for decays of ^{225}Np and ^{213}Fr. 2015De22 and 2018De38 also calculated half-life from theoretical considerations.

The evaluator treats the identification of ^{233}Bk in 2015De22 as tentative since in a long α-decay chain ^{233}Bk to ^{209}At shown in Fig. 2 and Table 1 of 2015De22 from a single correlated event, only one α-decay energy (that from ^{213}Fr α decay) matches that in literature, whereas its half-life of 110 s *+250−90* seems in poor agreement with the literature value of 34.8 s.

^{233}Bk Levels

E(level)	$T_{1/2}$	Comments
0	21 s *+48−17*	%α=?; %ε+%β^+=? From theoretical α and β decay half-lives of 4.6 s and 9.5 s, respectively in 2019Mo01, α decay is expected to be 68%, and ε+β^+ decay as 32%. E(level): detected α activity is assumed to correspond to the g.s. of ^{233}Bk. J^π: 3/2$^-$ from Ω(proton)=3/2$^-$ in theoretical calculations (2019Mo01). $T_{1/2}$: from measured correlation times of α-decay and reaction products (2015De22). In a correlated chain (2015De22) starting with ^{233}Bk, measured Eα=7.77 MeV *2* and $T_{1/2}$=21 s *+48−17* was followed by three correlated events: Eα=8.00 MeV *2*, $T_{1/2}$=6.4 ms *+149−54* assigned to ^{229}Am decay); Eα=16.6 MeV, $T_{1/2}$=3.8 ms *+76−27* (pileup event from ^{225}Np and ^{221}Pa decays); Eα=6.75 MeV *2*, $T_{1/2}$=110 s *+250−90* (assigned to ^{213}Fr decay). No event was seen from ^{217}Ac, possibly due to its short half-life.