Adopted Levels

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 156, 70 (2019)	31-Jan-2019

Q(β^-)=−3030 *SY*; S(n)=6380 *SY*; S(p)=1980 *SY*; Q(α)=9220 *40* 2017Wa10
Estimated uncertainties (2017Wa10): ΔQ(β^-)=170, ΔS(n)=290, ΔS(p)=200, ΔQ(α)=80.
Q(α) from Eα=9.08 MeV *4* (2004Mo42). Others: 9.43 MeV from Eα=9.29 MeV (2000Wi15), 9430 *80* (syst, 2017Wa10).
S(2n)=14100 *240*, S(2p)=5840 *290* (syst, 2017Wa10).
Edited by B. Singh, June 24, 2020: comment for half-life from 2000Wi15 modified. 1997Mo25 reference updated to 2019Mo01. No new experimental references since the 2019 update.

2000Wi15: chemical investigation aimed at the study of ^{266,267}Bh. Reaction: ^{249}Bk(^{22}Ne,5n) at the 88-inch cyclotron of LBNL which provided the $^{22}Ne^{(6+)}$ beam at energies of 148 and 153 MeV corresponding to 116-118 MeV and 122-124 MeV respectively in the target. The target was 0.81 mg/cm^2 ^{249}Bk as oxide prepared by the molecular plating technique. Chemical separation prior to this ensured that less than 0.5% of ^{249}Cf was present. Reaction products collected in a recoil chamber located directly behind the target. This chamber was continuously swept with He gas containing KCl aerosols to collect the products. The products were then guided through a TEFLON capillary (1.4 mm, 7 min in length) to the merry-go-round (Mg) rotating wheel system. One decay chain of ^{266}Bh was observed at the higher beam energy of 122-124 MeV followed by an α-decay sequence. The cross-section estimated for the 5n-reaction channel was 25-250 pb, based on an expected unhindered half-life of $T_{1/2}\approx$0.5 s for this nuclide with Q(α)=9.29 MeV. Due to the experimental set-up, this cross-section was strongly dependent on the assumed ^{267}Bh half-life. The estimated half-life for ^{266}Bh was $T_{1/2}\approx$1-10 s; suggested value is within 1 s. Fission decay properties of ^{266}Bh and ^{267}Bh could not be determined due to contamination from ^{256}Fm SF decay.

Event #1:
$E_{\alpha 1}$=9290 keV, t_1=0.87 s, assigned to ^{266}Bh.
$E_{\alpha 2}$=8540 keV, t_2=27.83 s, assigned to ^{262}Db.
$E_{\alpha 3}$=8740 keV, t_3=0.04 s, assigned to ^{258}Lr.

2004Mo42, 2007Mo43, 2012Mo25: ^{266}Bh produced as α-great-granddaughter of ^{278}Nh, which was formed in ^{209}Bi(^{70}Zn,n) E=349 MeV reaction at RIKEN. See ^{278}Nh Adopted Levels for details of three correlated decay chains observed. Results are summarized by 2015Mo25.
Additional information 1.

2006Qi03: ^{266}Bh produced directly in ^{243}Am(^{26}Mg,3n),E=162 MeV reaction (126 MeV at mid target) at HIRFL, Lanzhou facility. Total of four α-α-α correlated decay chains were observed. Deduced average Eα, $T_{1/2}$ of ^{266}Bh decay and production σ.
History of decay chains in 2006Qi03:
Event #1:
$E_{\alpha 1}$=8989 keV, t_1=1.13 s, assigned to ^{266}Bh.
$E_{\alpha 2}$=8459 keV, t_2=33.52 s, assigned to ^{262}Db.

Event #2:
$E_{\alpha 1}$=9071 keV, t_1=0.79 s, assigned to ^{266}Bh.
$E_{\alpha 2}$=8604 keV, t_2=34.14 s, assigned to ^{262}Db.

Event #3:
$E_{\alpha 1}$=8959 keV, t_1=0.51 s, assigned to ^{266}Bh.
$E_{\alpha 2}$=8542 keV, t_2=29.23 s, assigned to ^{262}Db.
$E_{\alpha 3}$=8641 keV, t_3=5.07 s, assigned to ^{258}Lr.

Event #4:
$E_{\alpha 1}$=9106 keV, t_1=1.52 s, assigned to ^{266}Bh.
$E_{\alpha 2}$=8518 keV, t_2=53.09 s, assigned to ^{262}Db.
Other: 1987ScZR.

For theoretical studies, consult Nuclear Science References (NSR) database at NNDC, BNL for 42 primary references dealing with

Adopted Levels (continued)

the half-lives and other aspects of nuclear structure in this mass region.

^{266}Bh Levels

Cross Reference (XREF) Flags

A ^{270}Mt α decay (0.48 s)

E(level)	$T_{1/2}$	XREF	Comments
0	2.1 s *+29−8*	A	%α≈100; %SF=? J^{π}: 2^-,3^- from Ω(proton)=5/2^-, Ω(neutron)=1/2^+ (2019Mo01,theory). $T_{1/2}$: from mean lifetime=3.0 s *+42−11* (2015Mo25 review article, analysis of three correlated decay chains observed in 2004Mo42, 2007Mo43 and 2012Mo25 at RIKEN). Others: 0.66 s *+59−26* (2006Qi03), ≈1 s in Fig. 1 and 1 to 10 s in the text (2000Wi15), 0.6 s *+29−3* (deduced by 2004Mo42, from 0.87 s in Table I of 2000Wi15, interpreted by 2004Mo42 as decay time of ^{266}Bh). Eα=9.08 MeV *4* (2004Mo42), 9.77 MeV *4* (2007Mo43), 9.39 MeV *6* (2012Mo25), 9.03 MeV *8* (2006Qi03), 9.29 MeV (2000Wi15) from α decay of ^{266}Bh. Unweighted average of the first four values is 9.32 MeV *17* (evaluator).