

**<sup>262</sup>Bh  $\alpha$  decay (83 ms) 2009He20,2006Fo02**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 144, 297 (2017)	25-Aug-2017

Parent: <sup>262</sup>Bh: E=0.0; T<sub>1/2</sub>=83 ms 14; Q( $\alpha$ )=10319 15; % $\alpha$  decay $\approx$ 100.0

<sup>262</sup>Bh-E: From 2017Au03.

<sup>262</sup>Bh-T<sub>1/2</sub>: From weighted average of 83 ms 14 (2009He20), 84 ms +21-16 (2006Fo02). Others: 120 ms +55-29 (2008Ne08, same laboratory (LBNL) as 2006Fo02), 102 ms 26 (1989Mu09), 115 ms +231-75 (1981Mu06). 1989Mu09 and 1981Mu06 are from the same laboratory (GSI) as 2009He20. In 2001Ak11 evaluation, T<sub>1/2</sub>=102 ms 26.

<sup>262</sup>Bh-Q( $\alpha$ ): From 2017Wa10, deduced from E $\alpha$ =10008 26 (2009He20) based on 156.5 level.

<sup>262</sup>Bh-% $\alpha$  decay: % $\alpha \approx$  100. No evidence was found by 2006Fo02 and 1989Mu09 for fission decay mode of <sup>262</sup>Bh, 2006Fo02 give an upper limit of 11% and 1989Mu09 suggest an upper limit of 10% for SF decay mode.

All the reported measurements related to the production cross sections, E $\alpha$ , half-life and decay modes of <sup>262</sup>Bh are from the GSI and LBNL accelerator laboratories.

2009He20: <sup>262</sup>Bh produced in the <sup>209</sup>Bi(<sup>54</sup>Cr,n) reaction, the <sup>54</sup>Cr beam delivered by the charge state injector of the UNILAC accelerator at GSI Darmstadt. Evaporation residues were separated by the velocity filter SHIP and implanted into a 16-strip Si PIPS detector. A box of six Si-wafers was used to measure escaping  $\alpha$ -particles. A Ge clover detector consisting of four crystals was used to measure  $\gamma$  rays in coincidence with particles. Measured E $\alpha$ , E $\gamma$ ,  $\alpha\gamma$  coin, half-lives,  $\sigma$ . Multiple events detected.

2008Ne08: <sup>262</sup>Bh produced in <sup>208</sup>Pb(<sup>55</sup>Mn,n),E=273-283 MeV; and <sup>209</sup>Bi(<sup>54</sup>Cr,n), E=253.5-272.3 MeV; measured excitation functions, E $\alpha$ ,  $\sigma$ , T<sub>1/2</sub> of <sup>262</sup>Bh decay. Single events detected.

2006Fo02: <sup>262</sup>Bh produced in <sup>208</sup>Pb(<sup>55</sup>Mn,n),E=260,264,268 MeV; measured E $\alpha$ , (evaporation residues) $\alpha\alpha$ -correlations, excitation functions, T<sub>1/2</sub> of <sup>262</sup>Bh decay.

1997Ho14: <sup>262</sup>Bh source from  $\alpha$ -decay of <sup>266</sup>Mt, measured E $\alpha$ . Single events detected.

1989Mu09: <sup>262</sup>Bh from <sup>209</sup>Bi(<sup>54</sup>Cr,n),E=4.87-5.07 MeV/nucleon, measured E $\alpha$ , (evaporation residues) $\alpha\alpha$ -correlations, T<sub>1/2</sub>. deduced no evidence for SF-decay of <sup>262</sup>Bh.

1981Mu06: <sup>262</sup>Bh produced in <sup>209</sup>Bi(<sup>54</sup>Cr,n),E=4.85 MeV/nucleon, measured E $\alpha$ , T<sub>1/2</sub>.

<sup>258</sup>Db Levels

E(level)	J $\pi^\dagger$	T <sub>1/2</sub> <sup>†</sup>
0.0	(5 <sup>+</sup> ,6 <sup>+</sup> )	4.3 s 5
156.5 7	(4 to 7) <sup>(-)</sup>	
222 20		
358 30		
480 20		

<sup>†</sup> From Adopted Levels.

$\alpha$  radiations

2009He20 state that the  $\alpha$  lines were modified by energy summing with conversion electrons, thus  $\alpha$  intensities could not be deduced unambiguously.

E $\alpha$	E(level)	Comments
9689 15	480	E $\alpha$ : from 2009He20; 12 events detected. Others: 9657 25 and 9727 25 (2006Fo02, single events); 9648, 9735, 9762 (2008Ne08); 9763 (1997Ho14); 9740 25 (1989Mu09); 9704 50 (1981Mu06). 38.9 $\gamma$ observed by 2009He20 in coin with 9671 $\alpha$ groups.
9809 25	358	E $\alpha$ : from 2006Fo02; 3 events. Other: 9831 (1997Ho14). 38.9 $\gamma$ observed by 2009He20 in coin with 9810 $\alpha$ groups.
9943 15	222	E $\alpha$ : from 2009He20; 6 events detected. Others: 9936 25 (2006Fo02, 4 events), 9910 25 (1989Mu09).

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<sup>262</sup>Bh  $\alpha$  decay (83 ms) **2009He20,2006Fo02 (continued)**

$\alpha$  radiations (continued)

<u>E<math>\alpha</math></u>	<u>E(level)</u>	<u>Comments</u>
10008 15	156.5	E $\alpha$ : from <b>2009He20</b> ; 10 events detected. Others: 10025, 10096, 10125 ( <b>2008Ne08</b> ), 10075 25 ( <b>2006Fo02</b> , 5 events), 10143 ( <b>1997Ho14</b> ), 10060 25 ( <b>1989Mu09</b> ).

$\gamma$ (<sup>258</sup>Db)

<u>E<math>\gamma</math></u>	<u>E<math>_i</math>(level)</u>	<u>J<math>^\pi_i</math></u>	<u>E<math>_f</math></u>	<u>J<math>^\pi_f</math></u>	<u>Mult.</u>	<u>Comments</u>
<sup>x</sup> 38.9 9						E $\gamma$ : from <b>2009He20</b> , $\gamma$ observed in coin with 9671 $\alpha$ and 9810 $\alpha$ groups.
156.5 7	156.5	(4 to 7) <sup>(-)</sup>	0.0	(5 <sup>+</sup> ,6 <sup>+</sup> )	(E1)	E $\gamma$ : from <b>2009He20</b> , observed in coin with 9952-10067 $\alpha$ group range (average $\alpha$ energy=10008 26). Mult.: possible E1, estimated from number of observed $\alpha\gamma$ coincidences.

<sup>x</sup>  $\gamma$  ray not placed in level scheme.

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Decay Scheme

