

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 156, 148 (2019)	31-Jan-2019

$Q(\beta^-) = -220$ SY; $S(n) = 5200$ SY; $S(p) = 3260$ SY; $Q(\alpha) = 9300$ 50 [2017Wa10](#)

Estimated uncertainties ([2017Wa10](#)): $\Delta Q(\beta^-) = 740$, $\Delta S(n) = 680$, $\Delta S(p) = 790$.

$S(2n) = 11580$ 600, $S(2p) = 8100$ 810 (syst, [2017Wa10](#)).

Other $Q(\alpha)$: 9.21 MeV 1 ([2017Og01](#), [2013Ru11](#)), 9.18 MeV 1 ([2015Og05](#)), 9.15 MeV 6 ([2004Og03](#)).

The ^{272}Bh nuclide is produced in about 100 (or 113) correlated decay chains observed at Dubna, GSI and Berkeley, starting from ^{288}Mc and ending in ^{268}Db , which decays by SF. Main references for production of ^{288}Mc : [2004Og03](#), [2005Og02](#), [2005Dm03](#), [2012Og02](#), [2013Ru11](#), [2015Ru11](#), [2013Og01](#), [2015Ga24](#), [2016Fo10](#). See ^{288}Mc Adopted Levels for details.

[2012Og02](#) and [2013Og01](#) proposed an isomer in ^{276}Mt with a half-life of 4 s, which could decay by α to ^{272}Bh , but it has not been confirmed in the work of [2013Ru11](#) (also [2016Fo10](#)). [2013Ru11](#) suggest that the isomer could be equally associated with ^{280}Rg or ^{272}Bh .

Data for excited states and gamma rays are from ^{276}Mt α decay based on studies by [2013Ru11](#) (at GSI) and [2015Ga24](#) (at Berkeley).

For theoretical studies, consult Nuclear Science References (NSR) database at NNDC, BNL for 56 primary references dealing with the half-lives and other aspects of nuclear structure in this mass region.

 ^{272}Bh LevelsCross Reference (XREF) Flags

A ^{276}Mt α decay (0.69 s)

E(level) [†]	T _{1/2}	XREF	Comments
0.0	10.5 s +15-11	A	<p>$\% \alpha \approx 100$</p> <p>Only the α decay mode has been observed.</p> <p>E(level): The observed activity is assumed to correspond to the ground state of ^{272}Bh, as seems suggested in level-scheme Fig. 3 of 2013Ru11.</p> <p>J^π: $1^-, 2^-$ from $\Omega(\text{proton}) = 1/2^-, \Omega(\text{neutron}) = 3/2^+$ (1997Mo25, theory).</p> <p>T_{1/2}: from 2016Fo10, based on detailed statistical analysis of 96 observed correlated events, starting from ^{288}Mc, in three laboratories (FLNR-JINR-DUBNA, GSI and Berkeley).</p> <p>Others: 10.6 s +16-11 (2017Og01 review; 10.9 s +20-15 2015Og05 review).</p> <p>Measurements: 9.8 s +117-35 (2004Og03, 2005Og02, 2011Og07 from three correlated events); 10.9 s +21-15 (2013Ru11, 2015Ru11 from all the known decay chains); 12.0 s +31-21 (2013Og01, update of 8.2 s +25-16 in 2012Og02).</p> <p>$E\alpha = 8.55$ to 9.20 MeV (2017Og01); 8.55-9.15 MeV (2015Og05); 8.73 to 9.15 MeV, 9.21 MeV 1 (2013Ru11); 9.07 MeV and 8.93 MeV (2015Ru11); 9.02 MeV 6 (2004Og03, 2011Og07), from ^{272}Bh α decay.</p>
60.2? 10		A	
196.2? 10		A	E(level): 226.2 keV if the ordering of 136 γ -166 γ cascade is reversed. Ordering of the two γ rays is not established.
362.2 5		A	
434? 1		A	
479.6? 23		A	

[†] From E_γ data.

Adopted Levels, Gammas (continued) $\gamma(^{272}\text{Bh})$

$E_i(\text{level})$	E_γ	I_γ	E_f	Mult. [‡]	$\alpha^@$
196.2?	136 [†] 1	100	60.2?	(E1) [#]	0.0878
362.2	166 [†] 1	10	196.2?	(E1) [#]	0.0543
	302 ^{&} 1	5	60.2?	[E1]	0.0554
	362.2 5	100	0.0	[E1]	0.0390
434?	434 ^{&} 1	100	0.0	[E1]	0.0278
479.6?	479.6 ^{&} 23	100	0.0	[E1]	0.0232

[†] Reversed ordering of the 166-136 γ cascade is also possible.

[‡] Multipolarities in square bracket are assumed by 2015Ga24 for GEANT simulations.

[#] Determined by 2015Ga24 from their experimental data and GEANT simulations, based on the expected counts of 166 γ and 136 γ as well as the observation of $\gamma\gamma$ -coincidences.

[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ -ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[&] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)