^{256}Db α decay 2001He35,2008Ne01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	A. M. Mattera, S. Zhu, A. B. Hayes, E. A. Mccutchan	NDS 172, 543 (2021)	1-Jan-2021

Parent: ^{256}Db: E=0.0; $T_{1/2}$=1.6 s *+5−3*; Q(α)=9340 *30*; %α decay=70 *11*

^{256}Db-Q(α): from 2017Wa10.

^{256}Db-$T_{1/2}$: from 2017Si08 based on value from 2001He35.

^{256}Db-%α decay: from 2017Si08, weighted average taken by 2008Ne01 of their result (which is not stated in the paper but presumably 76 % *11*), and %α =64 *12* by 2001He35 (implied from measured %ε =36 *12*).

2001He35: Source of ^{256}Db produced in ^{209}Bi(^{50}Ti,3n) at 4.59-5.08 MeV/A, evaporation residues implanted in 16 strips Si detector following filtering by SHIP separator. Measured Eα, $T_{1/2}(\alpha)$, $\alpha\alpha$ and αSF parent-daughter correlations. A total of 16 α-decay chains were observed, of which only 8 were used to estimate the decay energy.

2008Ne01: Production of ^{260}Bh in ^{209}Bi(^{52}Cr,n) at 202.4 MeV (center-of-mass energy of the beam in the center of the target). ^{256}Db was produced in α decay of ^{260}Bh. Evaporation residues implanted on a Si-strip detector array, after passing through a MWPC used for discrimination of implantation events from alpha-like decay events. Measured Eα, $T_{1/2}(\alpha)$. A total of 6 α-decay chains were observed.

^{252}Lr Levels

E(level)[†]	$T_{1/2}$	Comments
0.0	0.33 s *+8−7*	%ε+%β^+=60 calc; %α=40 calc; %SF<2 calc $T_{1/2}$: weighted average of 0.27 s *+18 −8* (2008Ne01) and 0.36 s *+11 −7* (2001He35). %α,%ε+%β^+,%SF: not measured for this nucleus. The probability for spontaneous fission of ^{252}Lr was studied by 1976Og02 through ^{203,205}Tl(^{50}Ti,xn) reactions, and an upper limit of 2% was estimated for its spontaneous fission decay. The theoretical calculations of 2019Mo01 give $T_{1/2\ 1/2}(\alpha)$=5.50 s and the partial half-life for Gamow-Teller β decay $T_{1/2\ 1/2}(\beta^+)$=1.98 s, hence %α ≈ 40, %ε+%β^+ ≈ 60, %SF<2.
120? *40*		
180 *30*		
310? *40*		

[†] From Q(α) differences; ΔE(level) added quadratically.

α radiations

Eα	E(level)	Iα[‡#]	HF[†]	Comments
8891 *20*	310?	≈11	≈16	Eα: α only reported in 2001He35. The uncertainty represents the FWHM of the detectors resolution determined during the calibration procedure.
9019 *16*	180	≈67	≈6.4	The value was taken as the weighted average of E(α) = 9030 keV *28* (from 2008Ne01, as the average of 4 α chains at 9030 keV *55*, 9020 keV *55*, 9040 keV *55*, 9030 keV *55*) and E(α) = 9014 keV *20* (reported in 2001He35 as the average of 5 α events).
9073 *19*	120?	≈11	≈58	The value was taken as the weighted average of E(α) = 9060 keV *55* from 2008Ne01 and E(α) = 9075 keV *20* reported in 2001He35. In both cases, the uncertainties represent the FWHM of the detectors resolution determined during the calibration procedure.
9190 *55*	0.0	≈11	≈128	For consinstency with AME16, the value was taken from 2008Ne01, assuming that the transition E(α) = 9190 keV *55* goes to the g.s.. The transition E(α) = 9120 keV *20* reported in 2001He35 is also thought to populate the g.s.. In both cases, the uncertainties represent the FWHM of the detectors resolution determined during the calibration procedure.

[†] $r_0(^{252}Lr)$=1.49 *3* calculated as average of the r_0 for the doubly-even neighboring nuclei. The other r_0′s were estimated by the evaluator based on existing scarce data, hence the large uncertainties on $r_0(^{252}Lr)$ and hindrance factors.

[‡] From 2001He35.

[#] For absolute intensity per 100 decays, multiply by 0.70 *11*.