^{232}Th α decay 1983Mi30,1989Sa01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Khalifeh Abusaleem	NDS 116, 163 (2014)	31-Dec-2012

Parent: ^{232}Th: E=0; $J^\pi=0^+$; $T_{1/2}=14.0\times10^9$ y *1*; Q(α)=4081.6 *14*; %α decay=100.0

1989Sa01: Spectra were collected from around 250 μg/cm^2, Th source for around 80 hours. Anion-exchange separation method was used to purify Thorium isotopes (^{228,232}Th) in order to minimize the background due to decay of the daughters. The solution was periodically purified to minimize the background from the decay of ^{228}Th. γ- spectrum was recorded using HPGe and planar Ge detectors, α-spectrum was recorded with Si surface barrier detector.

1983Mi30: Measured E_γ, I_γ, deduced α-branching ratio and levels.

^{228}Ra Levels

E(level)‡	J^π†	$T_{1/2}$	Comments
0	0^+		
63.810 *10*	2^+	0.55 ns *4*	$T_{1/2}$: from (α)(ce)(t) (1960Be25).
204.690 *15*	4^+		

† From Adopted Levels.
‡ From Eγ.

α radiations

Eα†	E(level)	Iα‡@	HF#	Comments
3811.1 *14*	204.690	0.069 *13*	16 *3*	Eα: from Eα to g.s. and E(level). Iα: 1959Ko58 report 0.20 *8*.
3947.2 *20*	63.810	21.7 *13*	0.98 *6*	Eα: other: 3950 *8* (1991Ry01, based on 1961Ko11). Iα: direct measurements: 23 *3* (1991Ry01, based on 1961Ko11), also 26 *4* from Iα(to 64 level)/Iα(to g.s.)=0.33 *5* (1989Sa01), 23 *2* (1959Ko58), 22 *2* (1956Al30), 24 *3* (1952Du12).
4012.3 *14*	0	78.2 *13*	1.00	Eα: other: 4013 *3* (1991Ry01, based on 1957Ha08, 1961Ko11, 1962Ko12). Iα: from Iα(3947), Iα(3811), and sum Iα=100%.

† From 1989Sa01, unless otherwise noted.
‡ From I(γ+ce) imbalance at each level based on absolute Iγ data. A 3% uncertainty in the theoretical α values has been adopted by the evaluator for the calculation of I(γ+ce).
# HF(4012.3α)=1.00 yields $r_0(^{228}Ra)=1.5359$ *14*.
@ Absolute intensity per 100 decays.

$\gamma(^{228}$Ra)

Iγ normalization: Iγ data are per 100 α decays.

E$_\gamma$†	I$_\gamma$#	E$_i$(level)	J_i^π	E$_f$	J_f^π	Mult.‡	α@	Comments
63.81 *1*	0.263 *13*	63.810	2^+	0	0^+	E2	82.0	α(L)=59.92 *5*; α(M)=16.22 *3*; α(N+..)=5.824 *5* E$_\gamma$: others: 63.81 *7* (1973Ta25 assigned to ^{232}Th by evaluator), 63.84 *6* (1989Sa01). I$_\gamma$: from 1983Ro23 relative to Iγ(84.4γ in ^{224}Ra)=1.248 *29* (1984Ge07) (the values given in 1983Ro23 are for

Continued on next page (footnotes at end of table)

^{232}Th α decay 1983Mi30,1989Sa01 (continued)

$\gamma(^{228}Ra)$ (continued)

E_γ [†]	I_γ [#]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	α [@]	Comments
140.88 *1*	0.021 *4*	204.690	4^+	63.810	2^+	E2	2.30	I(84.4γ)=1.21% *6*). Others: 0.24 *3* (1983Mi30), 0.29 *2* (1982Sa36) relative to I(238γ in ^{212}Bi)=43.0% *20*. α(K)=0.287; α(L)=1.47; α(M)=0.399; α(N+..)=0.145 E_γ: other: 140.83 *15* (1989Sa01). I_γ: from Iγ(141)/Iγ(64)=0.078 *14*. The ratio is a weighted average of 0.055 *10* (1989Sa01), 0.075 *13* (1983Mi30), 0.103 *3* (1983Ro23).

† From 1983Mi30.
‡ From adopted γ's.
# Absolute intensity per 100 decays.
@ 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.

^{232}Th α decay 1983Mi30,1989Sa01

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$