# $^{250}$Cf $\alpha$ decay 2007Ko01

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | C. D. Nesaraja | NDS 198,449 (2024) | 31-Jul-2022 |

Parent: $^{250}$Cf: E=0.0; $J^\pi=0^+$; $T_{1/2}$=13.08 y *9*; Q($\alpha$)=6128.51 *19*; %$\alpha$ decay=99.97

$^{250}$Cf-Q($\alpha$): From 2021Wa16.

$^{250}$Cf-$T_{1/2}$: From 2001Ak11.

$^{250}$Cf-%$\alpha$ decay: 0.9997385 *7* from %$\alpha$/%SF=3823 *10*, weighted average of 3822 *10* (1969Me01) and 3833 *32* (1971Ma32). Note that this branching is slightly different than the value in 2001Ak11.

2007Ko01: $^{250}$Cf was mass separated and prepared as a thin source by electromagnetic isotope separator at Argonne National Laboratory in the early 1970s. Via the ingrowth activity method, in 2006 $\alpha$ spectra from the decay of the source was measured using passivated implanted planar silicon (PIPS) detector (FWHM= 10keV) at small solid angles. Deduced $T_{1/2}$ and $\alpha$ emission probabilities.

1972Sc01: Alpha decay of $^{250}$Cf radioactive source was studied using two low-energy photon Ge(Li) detectors. Measured E$\gamma$.

Others: 1986Ry04,1971Ch15,1971Bb10,1970Ba18,1955As42.

## $^{246}$Cm Levels

| E(level) | $J^\pi$[†] | $T_{1/2}$[†] |
|---|---|---|
| 0.0 | $0^+$ | 4706 y *40* |
| 42.852 *5* | $2^+$ | 123.2 ps *23* |
| 142 *3* | $4^+$ | |
| 293 *3* | $6^+$ | |

[†] From Adopted Levels.

## $\alpha$ radiations

| E$\alpha$ | E(level) | I$\alpha$[†#] | HF[‡] | Comments |
|---|---|---|---|---|
| 5742 *3* | 293 | 0.007 *2* | $3.3\times10^2$ *10* | E$\alpha$: From 2007Ko01. Other: 5736 *7* (1970Ba18).<br>I$\alpha$: Other: ≈0.01 (1970Ba18). |
| 5891 *3* | 142 | 0.283 *15* | 53 *3* | E$\alpha$: From 2007Ko01. Other: 5890 *5* (1970Ba18).<br>I$\alpha$: Other: 0.3 (1970Ba18). |
| 5988.9 *6* | 42.852 | 17.11 *11* | 2.90 *3* | E$\alpha$: Weighted average of 5988 *3* (2007Ko01) and 5988.9 *6* (1991Ry01: corrected value of 1971Bb10).<br>I$\alpha$: Other: 15 (1970Ba18). |
| 6030.22 *20* | 0.0 | 82.6 *1* | 1.000 | E$\alpha$: Weighted average of 6030 *3* (2007Ko01) and 6030.22 *20* (1991Ry01: corrected value of 1971Bb10).<br>I$\alpha$: Other 84.7 (1970Ba18). |

[†] From 2007Ko01.

[‡] The nuclear radius parameter $r_0(^{246}Cm)$=1.48259 *30* is deduced by assuming HF=1.0 for the ground-state to ground-state alpha decay branch.

[#] For absolute intensity per 100 decays, multiply by 0.99973.

## $\gamma(^{246}Cm)$

| E$\gamma$ | I$\gamma$[‡] | E$_i$(level) | $J_i^\pi$ | E$_f$ | $J_f^\pi$ | Mult.[†] | $\alpha$[#] | Comments |
|---|---|---|---|---|---|---|---|---|
| 42.852 *5* | 0.01607 *25* | 42.852 | $2^+$ | 0.0 | $0^+$ | E2 | 1064 *15* | E$\gamma$: From 1972Sc01.<br>I$\gamma$: From intensity balance and conversion coefficient.<br>Mult.: L1:L2:L3:M2:M3:N2:N3:O2:O3:P23= 13.3 *15*:445 *14*:344:107.5 *30*:102.5 *30*:31.6 *12*:31.6 *12*:9.1 *10*:9.1 *10*:3.8 *10* (1971Ch15). |

Continued on next page (footnotes at end of table)

## $^{250}$Cf $\alpha$ decay 2007Ko01 (continued)

### $\gamma(^{246}Cm)$ (continued)

† From Adopted Gammas. Conversion electron data from 1971Ch15 are given in comments. I(ce) were normalized for subshell L3=349 by 1971Ch15. The evaluator deduced the re-normalization value using BrICC L3=345 *5*. A correction factor =0.986 was applied to all the conversion electron data.

‡ For absolute intensity per 100 decays, multiply by 0.99973.

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

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### Decay Scheme

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