^{257}Rf α decay (4.4 s) 2010St14

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 114, 1041 (2013)	1-Mar-2012

Parent: ^{257}Rf: E=0.0; J^π=(1/2$^+$); $T_{1/2}$=4.4 s *+6−5*; Q(α)=9083 *8*; %α decay=79.3 *14*

^{257}Rf-$T_{1/2}$: From ^{257}Rf Adopted Levels.

^{257}Rf-Q(α): From 2012Wa38.

^{257}Rf-%α decay: from 2010St14. %α=79 *2* (1997He29), %SF=2 *1* (2009Qi04), %ε+%β^+>0.

2010St14: ^{257}Rf produced In ^{261}Sg decay. ^{261}Sg produced in ^{208}Pb(^{54}Cr,n). Measured α, γ, $\alpha\gamma$. γ's measured by four-fold segmented clover detector. α energy resolution (FWHM)≈21 keV. γ energy resolution (FWHM) 1.3 *4* 4 keV. Authors modified results presented in their earlier work, 1997He29.

2009Qi04: ^{257}Rf produced In reaction ^{208}Pb(^{50}Ti,N), E=233 MeV. Measured α, γ, ce, γce.

1997He29: ^{257}Rf produced through the ^{208}Pb(^{50}Ti,n) reaction. ^{50}Ti beam produced by an electron cyclotron resonance source and accelerated to E=233 MeV by the ATLAS accelerator at Argonne National Laboratory. The evaporation residues were separated from unreacted beam particles by the Argonne Fragment Mass Analyzer. Particles and their decay products were detected using a parallel grid avalanche counter (PGAC) and a double-sided silicon strip detector (DSSD). Time-of-flight measurements were taken between the PGAC and the DSSD. Two high-purity germanium detectors and two low-energy photon spectrometers were used to measure γ's. Measured γ spectra, α spectra, conversion electrons, fission-like events and half-lives. Deduced isomer, Nilsson configurations.

The placements of the α groups is by 2009Qi04.

1997He29: ^{208}Pb(^{50}Ti,n), E=4.52 − 4.81 MeV/A. Measured α, (α)(α). Earlier work reported in 1985He06.

1973Be33, 1974BeWM: ^{249}Cf(^{12}C,4n), E=73 MeV. Measured α, γ, x-rays, (α)γ, (α)K x ray, (α)γ(t).

Other: 1969Gh01.

Observed No K x ray, thus identifying this as α decaying parent of No (1973Be33).

Levels (J^π) (Eα) reported In 1997He29 but not In 2010St14: 39 (11/2$^-$) (8864), 125 (5/2$^+$) (8779), 209 (9/2$^+$)(8697), 319 (8589?), 385 (7/2$^+$) (8524), 439 (9/2$^+$) (8471), 485 (11/2$^+$) (8426).

^{253}No Levels

E(level)[†]	J^π	$T_{1/2}$	Comments
0.0	(9/2$^-$)		J^π: configuration= 9/2[734].
166.7 *10*	(5/2$^+$)	24 μs *2*	J^π: configuration= 5/2[622].
257.4 *15*	(3/2$^+$,5/2$^+$,7/2$^+$)		
450.1 *15*	(1/2$^+$)		
510?			
670	(1/2$^+$)		J^π: configuration= 1/2[620].

[†] From least-squares fit to Eγ assuming ΔEγ=1 keV.

α radiations

I(K x-rays)=0.16 *4* per α decay (1973Be33).

Eα	E(level)	HF	Comments
8283	670	1.7 *2*	Eα: from 2009Qi04.
8450[†] *15*	510?		
8510 *15*	450.1		
8686 *15*	257.4		
8778 *10*	166.7		
8950 *15*	0.0		

[†] Existence of this branch is questionable.

^{257}Rf α decay (4.4 s) 2010St14 (continued)

γ(^{253}No)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α†	Comments
90.7	257.4	(3/2+,5/2+,7/2+)	166.7	(5/2+)	(M1)	17.25	α(L)=12.86 *18*; α(M)=3.20 *5*; α(N+..)=1.191 *17* α(N)=0.900 *13*; α(O)=0.242 *4*; α(P)=0.0471 *7*; α(Q)=0.00254 *4*
166.7	166.7	(5/2+)	0.0	(9/2−)	M2(+E3)	49.7 *24*	α(K)=15 *15*; α(L)=25 *9*; α(M)=8 *3*; α(N+..)=2.9 *11* α(N)=2.2 *9*; α(O)=0.58 *22*; α(P)=0.10 *3*; α(Q)=0.0020 *13*
283.4	450.1	(1/2+)	166.7	(5/2+)	(E2)	0.438	α(K)=0.0946 *14*; α(L)=0.247 *4*; α(M)=0.0703 *10*; α(N+..)=0.0262 *4* α(N)=0.0201 *3*; α(O)=0.00522 *8*; α(P)=0.000874 *13*; α(Q)=9.88×10^{-6} *14*

† 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.

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Decay Scheme