^{253}No IT decay (627 μs) 2011An13

History

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

Parent: ^{253}No: E=1440+x; $T_{1/2}$=627 μs *5*; %IT decay=?

2011An13: ^{207}Pb(^{48}Ca,2nγ) Beam=^{48}Ca, E=218.4 MeV. Produced via ecr-ion source of the unilac at GSI. Target=^{207}Pb of thickness 418 μg/cm^2 enriched to 98.9% evaporated on a 40 μg/cm^2 carbon backing. Evaporation residues (ERs) separated by velocity filter SHIP, implantation events detected by position-sensitive 16-strip PIPS detector in the focal plane of SHIP. γ-rays detected using a four crystal Ge-clover detector, calibrated with ^{133}Ba and ^{152}Eu with estimated accuracy of ±0.3 keV. Measured Eγ, Iγ, ER-γ coin, (ce)γ coin and $\gamma\gamma$ coin. Deduced levels and $T_{1/2}$ of isomeric states.

Delayed γ rays reported in this study, although both delayed and prompt coincidences were measured.

^{253}No Levels

E(level)	J^π	$T_{1/2}$	Comments
0	$9/2^-$		
167.5 *5*	$5/2^+$	22.7 μs *5*	$T_{1/2}$: based on exponential fit to the background-subtracted decay curve constructed from time differences between ER implantation and K x rays (2011An13).
1440+x		627 μs *5*	Additional information 1. E(level): lower limit established base on observed gamma ray transition energies and intensities, however an unambiguous decay scheme could not be established (2011An13). $T_{1/2}$: from all observed events, however a value of 552 μs *15* is obtained for K x-rays in coincidence with CE and 650 μs *15* by only considering the highest γ transition peaks (802, 713, and 209 keV) (2011An13).
y?			Additional information 2. There may be another isomer to explain the observed transitions and a different half-life of 552 μs obtained from decay curve for x rays.

γ(^{253}No)

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[#]	Comments
[x]64.1[‡] *3*	2.8 *4*							
[x]76.0[‡] *3*	6.9 *4*							
[x]88.5[‡] *3*	10.4 *7*							In coin with L x rays, 76.0γ, 88.5γ, (209.2γ), 714.3γ, 802.1γ.
[x]99.0[‡] *3*	8.4 *6*							In coin with L x rays, 76.0γ, 88.5γ, (209.2γ), 714.3γ, 802.1γ.
[x]109.9[‡] *3*	9.8 *6*							In coin with L x rays, 76.0γ, 88.5γ, (209.2γ), 714.3γ, 802.1γ.
[x]155.1[‡] *3*	3.1 *3*							
167.5 *5*		167.5	$5/2^+$	0	$9/2^-$	M2	51.1 *9*	α(K)exp=25.5 *23* (2011An13) α(K)=28.5 *5*; α(L)=16.3 *3*; α(M)=4.55 *9*; α(N+..)=1.74 *4* α(N)=1.317 *25*; α(O)=0.353 *7*; α(P)=0.0660 *13*; α(Q)=0.00322 *6* B(M2)(W.u.)=0.00497 *16*
[x]188.3[‡]	9.0 *6*							
[x]209.2[‡]	25.6 *12*							In coin with (L x rays), K x rays, 76.0γ, 88.5γ, 714.3γ, 802.1γ.
[x]255.1	4.7 *4*							
[x]614.6	6.5 *7*							
[x]703.6	1.2 *3*							
[x]714.3	37.7 *20*							In coin with L x rays, 64.1γ, 76.0γ, 88.5γ, 209.2γ.
[x]780.1	7.5 *8*							

Continued on next page (footnotes at end of table)

^{253}No IT decay (627 μs) 2011An13 (continued)

γ(^{253}No) (continued)

E_γ †	I_γ	E_i(level)	Comments
x802.1	100		In coin with L x rays, 64.1γ, 76.0γ, 88.5γ, 99.0γ, 188.3γ, 209.2γ.
x845.3	3.0 *5*		
x877.7	3.7 *3*		

† In the 100-keV range, energy uncertainty is reported as 0.3 keV (2011An13).
‡ Observed γ is close in energy with a known γ ray in g.s. band reported in previous in-beam γ-ray studies, but the agreement is not good, and the intensity patterns do not give a convincing evidence that a band populated in the decay of a 627−μs isomer feeds the g.s. band members. Several scenarios for level scheme and Nilsson band configuration have been considered by 2011An13 but none found satisfactory. Thus no level scheme is proposed by the authors.
# 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.
x γ ray not placed in level scheme.

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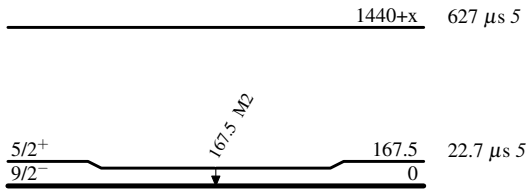
Decay Scheme

Intensities: Relative I_γ
%IT=?



$^{253}_{102}No_{151}$