^{13}C(^{48}Ca,2pγ)   **2004Fr17**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 151, 1 (2018)	1-Apr-2018

Target: ^{13}C enriched to 90%; Projectile E=130 MeV. Ions recoiling from the target position were separated from the primary beam particles by the Fragment Mass Analyzer. A parallel-grid avalanche counter (PGAC) was used for the horizontal and vertical positions and a segmented ion chamber was used to measure the energy-loss of the recoiling ions. Measured Eγ, Iγ, $\gamma\gamma$, (charged particle)γ coin with the GAMMASPHERE array which consisted of 93 Compton-suppressed Ge detectors, 52 of which were of a type with the outer electrode segmented into two halves.

^{59}Cr Levels

E(level)[†]	J$^{\pi}$[‡]	Comments
0.0	(1/2)$^-$	
102.70 20	(3/2)$^-$	E(level): 208 _1_ in Adopted Levels, based on reversed cascade of 207.1γ-102.7γ from other studies with better statistics.
309.8 _4_	(5/2)$^-$	
502.7 _11_	(9/2$^+$)	E(level): From Adopted Levels.
827.8 _5_	(7/2$^-$)	J$^{\pi}$: (13/2$^+$) in table I of 2004Fr17 is a misprint (as per e-mail reply of June 7, 2004 from S.J. Freeman).
1083.8? _11_	(9/2)$^-$	E(level),J$^{\pi}$: 1093.8, (7/2)$^-$ in table I of 2004Fr17 are misprint (as per e-mail reply of June 7, 2004 from S.J. Freeman). Level marked as questionable by evaluator based on uncertain 256γ placement.
1316.0 _11_	(13/2$^+$)	J$^{\pi}$: (9/2)$^-$ in table I of 2004Fr17 is a misprint (as per e-mail reply of June 7, 2004 from S.J. Freeman).

[†] From Eγ's.

[‡] Proposed in 2004Fr17 on the basis of ^{59}Cr β^- decay to ^{59}Mn, γ-ray placement, analysis of transition strengths, and assumption of yrast state feeding.

γ(^{59}Cr)

E$_\gamma$	I$_\gamma$[#]	E$_i$(level)	J$^{\pi}_i$	E$_f$	J$^{\pi}_f$	Mult.	α[@]	I$_{(\gamma+ce)}$[‡]	Comments
102.7[†] _2_	97.6	102.70	(3/2)$^-$	0.0	(1/2)$^-$	[M1]	0.0248	100	ce(K)/(γ+ce)=0.0215 _7_; ce(L)/(γ+ce)=0.00207 _7_
193 _1_		502.7	(9/2$^+$)	309.8	(5/2)$^-$	[M2]	0.0303		α(K)=0.0267 _8_; α(L)=0.00268 _8_ E$_\gamma$: from Adopted Gammas; not observed by 2004Fr17 due to the long lifetime (96 μs) of the isomer.
207.1[†] _3_	82 _19_	309.8	(5/2)$^-$	102.70	(3/2)$^-$	[M1]	0.00415	82 _19_	α=0.00415; ce(K)/(γ+ce)=0.00367 _11_; ce(L)/(γ+ce)=0.00035 _1_
256[&] _1_	19 _13_	1083.8?	(9/2)$^-$	827.8	(7/2$^-$)	[E2]		19 _13_	
518.0 _2_	55 _28_	827.8	(7/2$^-$)	309.8	(5/2)$^-$	[M1]	0.00049	55 _28_	α=0.00049; ce(K)/(γ+ce)=0.00043 _1_
813.2 _3_	220 _26_	1316.0	(13/2$^+$)	502.7	(9/2$^+$)	[E2]	0.00027	220 _26_	α=0.00027; ce(K)/(γ+ce)=0.00024 _1_

[†] Cascade of 207.1γ-102.7γ is reversed in Adopted Gammas, based on other studies (2005Li53) with better statistics.

[‡] Determined from an A/q-gated γ-ray spectrum without any timing gates placed on the individual Ge detectors. 2004Fr17 state that photon intensities have been corrected for internal conversion, but no multipolarities are listed explicitly.

[#] Deduced (by evaluator) from I(γ+ce) and α.

[@] 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.

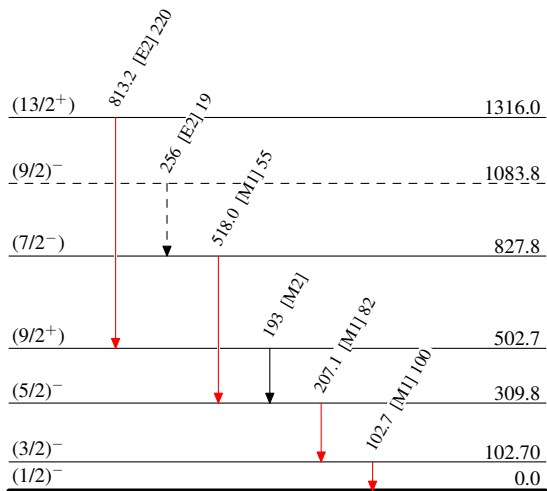[&] Placement of transition in the level scheme is uncertain.

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Legend

Level Scheme

Intensities: Relative $I_{(\gamma+ce)}$

$I_\gamma < \ \ 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)

$(13/2^+)$ 1316.0

$(9/2)^-$ - - - - - - - - - - - - - - - - - - -   1083.8

$(7/2^-)$ 827.8

813.2 [E2] 220
256 [E2] 19
518.0 [M1] 55
193 [M2]
207.1 [M1] 82
102.7 [M1] 100

$(9/2^+)$ 502.7

$(5/2)^-$ 309.8

$(3/2)^-$ 102.70
$(1/2)^-$ 0.0

$^{59}_{24}\text{Cr}_{35}$