$^{147}Sm(^3He,3n\gamma)$ 1983Ko42

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	N. Nica and B. Singh	NDS 181, 1 (2022)	9-Mar-2022

E=22 MeV.
1983Ko42 use the (^{3}He,3nγ) and (α,nγ) reactions to measure excitation functions, $\gamma(\theta)$, γ(t), ce and $\gamma\gamma$.
Others: 1980MuZS, 1981KlZY, 1982Kl04, 1982KlZX, 1982KlZY, 1982Pi07, 1983KoZP.

^{147}Gd Levels

E(level)	J$^\pi$ †	$T_{1/2}$ #	Comments
0.0	7/2$^-$		Configuration=(ν $f_{7/2}$).
997.1‡	13/2$^+$	20.5 ns *15*	
1152.4	3/2$^-$		Configuration=(ν $p_{3/2}$).
1292.3	1/2$^+$		Configuration=$((\nu\ s_{1/2})^{-1}(\nu\ j_0)^2)_{1/2+}$.
1397.0	9/2$^-$	0.35@ ps *21*	Configuration=(ν $h_{9/2}$).
1412.0	3/2$^+$		Configuration=$((\nu\ d_{3/2})^{-1}(\nu\ j_0)^2)_{3/2+}$.
1628.3‡	7/2$^+$	0.42@ ps *21*	J$^\pi$: from E1 to 7/2$^-$ and positive A_2 in $\gamma(\theta)$ (1983Ko42).
1643.0‡	9/2$^+$		J$^\pi$: from E1 to 7/2$^-$, negative A_2 in $\gamma(\theta)$ and excitation function (1983Ko42).
1699.4‡	3/2$^+$		
1701.6‡	11/2$^+$		
1759.2‡	(1/2)$^+$		
1797.1	9/2$^-$	0.14@ ps *7*	Configuration=$((^{146}Gd\ 2^+)(\nu\ f_{7/2}))_{9/2-}$.
1846.8	1/2$^-$		Configuration=(ν $p_{1/2}$).
2385.9	(13/2)$^-$		
2438.9	(15/2)$^-$		
2488.2	17/2$^+$		Configuration=$((^{146}Gd\ 5^-)(\nu\ f_{7/2}))_{17/2+}$.
2489.8	(13/2)		Additional information 1.
2572.3	19/2$^-$	0.37 ns *8*	$T_{1/2}$: from pulsed beam in (^{3}He,3nγ) (1982Kl04). Configuration=$((3^-)^2_6(\nu f_{7/2}))_{19/2-}$ (two-phonon octupole state). Additional information 2.
2625.9			
2736.0			
2760.5	21/2$^+$	4.6 ns *3*	Configuration=$((^{146}Gd\ 7^-)(\nu\ f_{7/2}))_{21/2+}$.
2763.8	(19/2$^+$)		
2941.6			
2942.7			
2960.3			
3038.4	23/2$^+$		Configuration=$((^{146}Gd\ 8^-)(\nu\ f_{7/2}))_{23/2+}$.
3082.5			
3170.0			
3186.4	23/2$^+$		
3227.9			
3360.2			
3399.4	25/2$^+$		Configuration=$((^{146}Gd\ 9^-)(\nu\ f_{7/2}))_{25/2+}$.
3582.2	27/2$^-$		Configuration=$((^{146}Gd\ 10^+)(\nu\ f_{7/2}))_{27/2-}$.

† From 1983Ko42, unless otherwise stated.
‡ Member of a $((\nu\ f_{7/2})(^{146}Gd\ 3^-))$ septuplet.
# From pulsed beam in 1983Ko42, unless otherwise stated.
@ From Doppler shifts in 1983Ko42.

$^{147}Sm(^{3}He,3n\gamma)$ 1983Ko42 (continued)

$\gamma(^{147}Gd)$

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
84.0 *1*	35 *5*	2572.3	19/2⁻	2488.2	17/2⁺		A_2=−0.09 *5*, A_4=−0.10 *8*.
119.7 *1*	35 *4*	1412.0	3/2⁺	1292.3	1/2⁺		
139.9 *1*	113 *9*	1292.3	1/2⁺	1152.4	3/2⁻		A_2=−0.03 *3*, A_4=0.02 *4*.
178.9 *4*	10 *3*	2942.7		2763.8	(19/2⁺)		A_2=−0.15 *2*, A_4=−0.02 *2*.
182.2 *3*	21 *3*	2942.7		2760.5	21/2⁺		A_2=0.09 *4*, A_4=−0.03 *5* for 182.2γ and 182.8γ.
182.8 *4*	15 *3*	3582.2	27/2⁻	3399.4	25/2⁺		A_2=0.09 *4*, A_4=−0.03 *5* for 182.2γ and 182.8γ.
188.0 *2*	28 *3*	2760.5	21/2⁺	2572.3	19/2⁻		A_2=−0.19 *3*, A_4=−0.02 *4*.
272.3 *1*	114 *9*	2760.5	21/2⁺	2488.2	17/2⁺	E2	α(K)exp=0.074 *15* A_2=0.27 *2*, A_4=−0.08 *3*.
275.6 *1*	66 *7*	2763.8	(19/2⁺)	2488.2	17/2⁺	M1	α(K)exp=0.12 *4* (1983Ko42) A_2=−0.08 *3*, A_4=−0.04 *5*.
277.9 *2*	40 *6*	3038.4	23/2⁺	2760.5	21/2⁺		A_2=−0.06 *2*, A_4=−0.01 *2*.
318.7 *4*	10 *3*	3082.5		2763.8	(19/2⁺)		
321.8 *4*	8 *3*	3360.2		3038.4	23/2⁺		A_2=−0.35 *11*, A_4=0.02 *16*.
347.2 *10*	8 *3*	1759.2	(1/2)⁺	1412.0	3/2⁺	M1	α(K)exp=0.052 *16*
350.1 *4*	10 *4*	2736.0		2385.9	(13/2)⁻		A_2=−0.02 *3*, A_4=−0.08 *4*.
361.0 *2*	22 *4*	3399.4	25/2⁺	3038.4	23/2⁺		A_2=0.03 *3*, A_4=0.01 *5*.
407.0 *3*	11 *3*	1699.4	3/2⁺	1292.3	1/2⁺	M1+E2	α(K)exp=0.025 *7* A_2=0.30 *11*, A_4=0.06 *17*.
409.5 *4*	13 *5*	3170.0		2760.5	21/2⁺		
425.9 *3*	18 *5*	3186.4	23/2⁺	2760.5	21/2⁺		A_2=−0.10 *6*, A_4=−0.04 *9*.
453.4 *4*	8 *3*	2941.6		2488.2	17/2⁺		
464.1 *4*	7 *3*	3227.9		2763.8	(19/2⁺)		A_2=−0.15 *7*, A_4=−0.03 *12*.
472.1 *10*	6 *4*	2960.3		2488.2	17/2⁺		
547.0 *3*	22 *4*	1699.4	3/2⁺	1152.4	3/2⁻	E1	α(K)exp<0.005
694.4 *10*	5 *3*	1846.8	1/2⁻	1152.4	3/2⁻		
704.5 *2*	117 *11*	1701.6	11/2⁺	997.1	13/2⁺	M1	α(K)exp=0.0084 *10* A_2=−0.13 *2*, A_4=−0.04 *4*.
788.2 *3*	35 *5*	2489.8	(13/2)	1701.6	11/2⁺		A_2=−0.20 *3*, A_4=−0.08 *3*.
997.1 *1*	1000	997.1	13/2⁺	0.0	7/2⁻	[E3]	α(K)=0.00491 α(K): value used to normalize ce(K) to Iγ. A_2=0.28 *1*, A_4=−0.01 *2*.
1152.4 *1*	171 *14*	1152.4	3/2⁻	0.0	7/2⁻	E2	α(K)exp=0.0015 *3* A_2=−0.03 *2*, A_4=0.03 *2*.
1388.8 *3*	24 *3*	2385.9	(13/2)⁻	997.1	13/2⁺	E1	α(K)exp=0.0007 *2* A_2=0.22 *12*, A_4=0.06 *20*.
1397.0 *1*	185 *15*	1397.0	9/2⁻	0.0	7/2⁻	M1	α(K)exp=0.0016 *2* A_2=0.22 *1*, A_4=0.03 *2*.
1441.8 *2*	52 *5*	2438.9	(15/2)⁻	997.1	13/2⁺	E1	α(K)exp=0.0005 *2*
1491.1 *1*	308 *25*	2488.2	17/2⁺	997.1	13/2⁺	E2	α(K)exp=0.0010 *1* A_2=0.25 *1*, A_4=−0.05 *1*.
1575.2 *3*	41 *8*	2572.3	19/2⁻	997.1	13/2⁺	E3	α(K)exp=0.0018 *4* A_2=0.34 *4*, A_4=0.05 *6*.
ˣ1577.7 *3*	23 *7*						
1628.3 *4*	91 *15*	1628.3	7/2⁺	0.0	7/2⁻	E1	α(K)exp=0.00054 *15* A_2=0.24 *4*, A_4=−0.02 *6* for 1628 doublet. I_γ: from I(γ)(1628.3)+I(γ)(1628.8) and Iγ(1628.8). Mult.: from α(K)exp of 1628 doublet.
1628.8 *10*	40 *15*	2625.9		997.1	13/2⁺	E1	α(K)exp=0.00054 *15* A_2=0.24 *4*, A_4=−0.02 *6* for 1628 doublet. I_γ: from γγ. Mult.: from α(K)exp of 1628 doublet.
1643.0 *3*	87 *9*	1643.0	9/2⁺	0.0	7/2⁻	E1	α(K)exp=0.00040 *10* A_2=−0.10 *4*, A_4=−0.07 *6*.
1797.1 *4*	88 *10*	1797.1	9/2⁻	0.0	7/2⁻	M1+E2	α(K)exp=0.00086 *20* A_2=0.18 *8*, A_4=−0.01 *10*.

Continued on next page (footnotes at end of table)

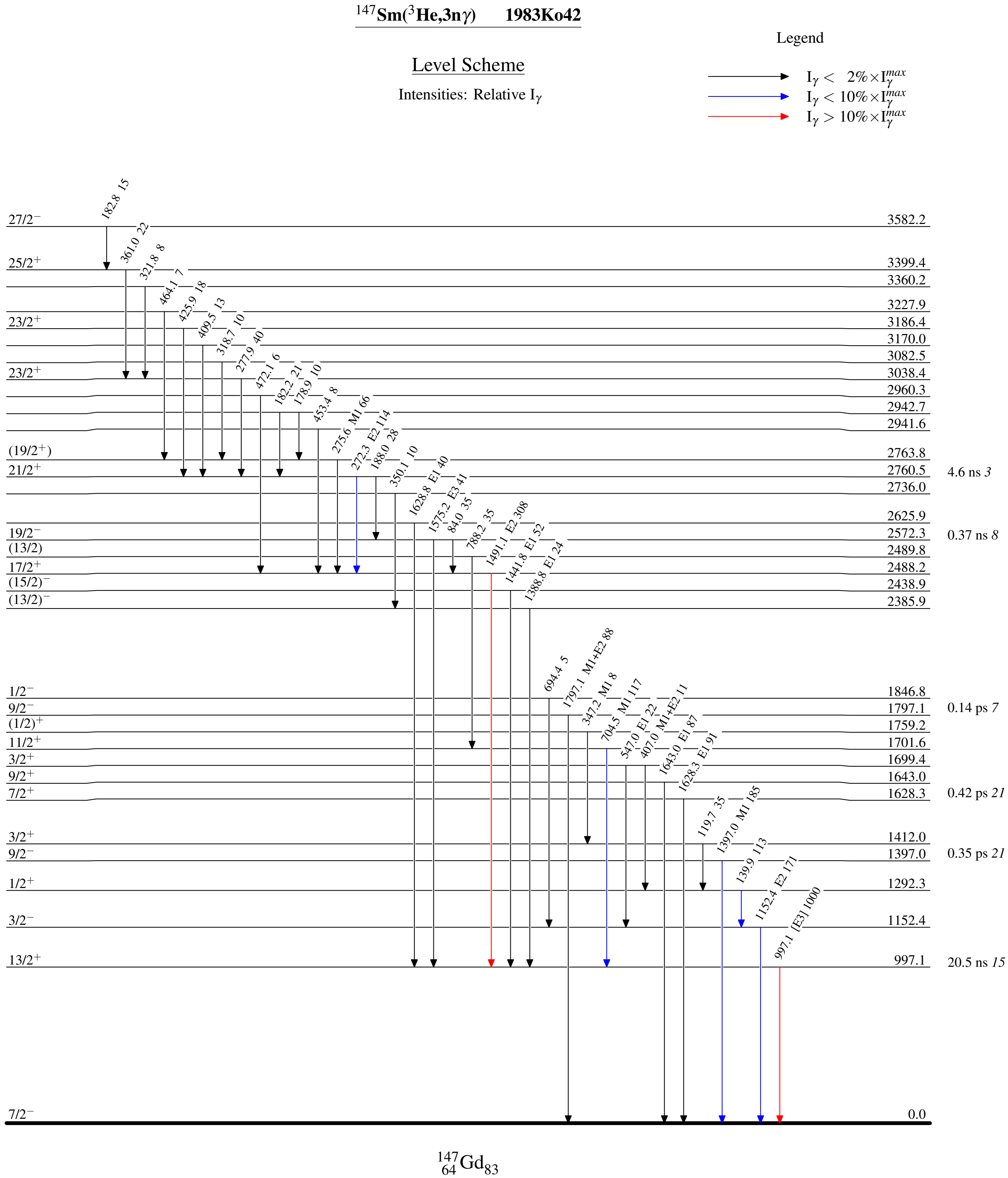
^{147}Sm(^{3}He,3nγ) 1983Ko42 (continued)

γ(^{147}Gd) (continued)

† Normalized to 1000 for the 997.1-keV transition.

‡ Mult determined from α(K)exp and $\gamma(\theta)$ measurements by 1983Ko42 normalizing ce(K) to 997.1 keV transition, unless otherwise stated. Data are based on combined results from authors′ (^{3}He,3nγ) and (α,nγ) work at 22 MeV and 20 MeV.

^{x} γ ray not placed in level scheme.


$^{147}Sm(^3He,3n\gamma)$ 1983Ko42
Level Scheme
Intensities: Relative I_γ
Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
27/2⁻ 3582.2
25/2⁺ 3399.4
3360.2
3227.9
23/2⁺ 3186.4
3170.0
3082.5
23/2⁺ 3038.4
2960.3
2942.7
2941.6
(19/2⁺) 2763.8
21/2⁺ 2760.5 4.6 ns 3
2736.0
2625.9
19/2⁻ 2572.3 0.37 ns 8
(13/2) 2489.8
17/2⁺ 2488.2
(15/2)⁻ 2438.9
(13/2)⁻ 2385.9
1/2⁻ 1846.8
9/2⁻ 1797.1 0.14 ps 7
(1/2)⁺ 1759.2
11/2⁺ 1701.6
3/2⁺ 1699.4
9/2⁺ 1643.0
7/2⁺ 1628.3 0.42 ps 21
3/2⁺ 1412.0
9/2⁻ 1397.0 0.35 ps 21
1/2⁺ 1292.3
3/2⁻ 1152.4
13/2⁺ 997.1 20.5 ns 15
7/2⁻ 0.0
182.8 15
361.0 22
321.8 8
464.1 7
425.9 18
409.5 13
318.7 10
277.9 40
472.1 6
182.2 21
178.9 10
453.4 8
275.6 M1 66
272.3 E2 114
188.0 28
350.1 10
1628.8 E1 40
1575.2 E3 41
84.0 35
788.2 35
1491.1 E2 308
1441.8 E1 52
1388.8 E1 24
694.4 5
1797.1 M1+E2 88
347.2 M1 8
704.5 M1 117
547.0 E1 22
407.0 M1+E2 11
1643.0 E1 87
1628.3 E1 91
119.7 35
1397.0 M1 185
139.9 113
1152.4 E2 171
997.1 [E3] 1000
$^{147}_{64}Gd_{83}$