

$^{248}\text{Cm}(\alpha, t), (^3\text{He}, d)$ **1975Er01**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja	NDS 195,718 (2024)	12-Oct-2023

1975Er01:

$^{248}\text{Cm}(\alpha, t)$: 29 MeV beams of α particles from the University of Minnesota MP tandem Van de Graaff accelerator were used to bombard ^{248}Cm targets. The reaction products were studied with an Enge split-pole magnetic spectrograph. Absolute cross sections were determined using two silicon monitor detectors. Cross sections were measured at 80° with the energy resolution width for the spectra between 18-25 keV. Theoretical calculation performed using the DWBA DWUCK code to deduce spectroscopic factor.

$^{248}\text{Cm}(^3\text{He}, d)$: 29 MeV beams of ^3He particles from the University of Minnesota MP tandem Van de Graaff accelerator were used to bombard ^{248}Cm targets. The reaction products were studied with an Enge split-pole magnetic spectrograph. Absolute cross sections were determined using two silicon monitor detectors. Cross sections were measured at 60° with the energy resolution width for the spectra between 18-25 keV. Theoretical calculation performed using the DWBA DWUCK code to deduce spectroscopic factor.

All data are from **1975Er01**.

 ^{249}Bk Levels

E(level) keV	Cross section data from 1975Er01		
	$d\sigma(\alpha, t)/d\Omega$ 80°	$d\sigma(^3\text{He}, d)/d\Omega$ 60°	$d\sigma(\alpha, t)/d\sigma(^3\text{He}, d)$
	$\mu\text{b/sr}$	$\mu\text{b/sr}$	
7	9.8 1	4.3 7	2.3 4
43	14.1 15	5.1 5	2.8 5
83	70.7 4	15.5 12	4.6 4
130	<4	1.8 6	
155	53.3 3	9.6 8	5.6 6
199	4.4 1	2.3 8	1.9 8
377	10.7 8	2.9 4	3.7 6
413	4.7 7	1.5 3	3.1 8
483	<2	0.3 2	
553	2.0 1	1.0 8	2.0 19
570	8.2 7	4.0 6	2.1 4
599	4.3 6	<1	
625	26.9 15	8.3 9	3.2 4
650	8.3 2	5.4 6	1.5 4
682	0.5 4	1.0 5	0.5 5
709	12.9 8	1.0 6	13 10
719	2.09	6.0 15	0.33 17
750	34.4 15	10.0 8	3.4 3
769	3.9 7	<0.8	
794	1.3 5	0.9 6	1.1 9
829	3.2 10	0.5 4	6.4 55
840	7.9 10	1.3 6	6.1 29
909	<1	0.8 4	
936	8.3 10	3.9	2.1
947	1.0 6	1.0 6	1.0 9
986	1.7	<0.5	
1134	1.7	<0.5	
1158	1.1	1.0	1.1
1186	1.7	2.0	0.85
1229	24 2	8.5 8	2.8 3
1311	3.8 8	2.9 7	1.3 4
1347	3.1 8	2.5 6	1.2 4
1390	3.8 8	2.4 6	1.6 5

Continued on next page (footnotes at end of table)

$^{248}\text{Cm}(\alpha, t), (^3\text{He}, d)$ **1975Er01 (continued)** ^{249}Bk Levels (continued)

E(level)	J^π [†]	$S(\alpha, t)$	Comments
0 [#]	7/2 ⁺		
7 [‡]	3/2 ⁻	0.12 2	$S(^3\text{He}, d)=0.076$ 2, $S(\alpha, t)=0.12$ 2.
43 [#]	9/2 ⁺ , 5/2 ⁻	0.20 2	$S(^3\text{He}, d)=0.12$ 2, $S(\alpha, t)=0.20$ 2. E(level): Unresolved doublet.
83 [‡]	7/2 ⁻	0.55 3	$S(^3\text{He}, d)=0.18$ 2, $S(\alpha, t)=0.55$ 3. E(level): Reference state, excitation energy assumed to be 83 keV.
130 [‡]	9/2 ⁻	<0.13	$S(^3\text{He}, d)=0.109$ 4, $S(\alpha, t)<0.13$.
155 [#]	13/2 ⁺	0.58 4	$S(^3\text{He}, d)=0.22$ 2, $S(\alpha, t)=0.58$ 4.
199 [‡]	11/2 ⁻	0.05 2	$S(^3\text{He}, d)=0.05$ 2, $S(\alpha, t)=0.05$ 2.
377 [@]	(1/2 ⁺)	0.48 4	$S(^3\text{He}, d)=0.11$ 2, $S(\alpha, t)=0.48$ 4.
413 [@]	(3/2 ⁺ , 5/2 ⁺)	0.15 2	$S(^3\text{He}, d)=0.050$ 1, $S(\alpha, t)=0.15$ 2.
483 ^{&}	(9/2 ⁺)		
553 ^d	(1/2)		
570 ^d	(3/2)		
599 ^{&}	(13/2 ⁺)		
625 ^a	(9/2 ⁻)		
650 5			E(level): Unresolved doublet.
682 ^a	(11/2 ⁻)		
709 5			
719 4			
750 ^b	(9/2 ⁻)	1.30 10	$S(^3\text{He}, d)=0.48$ 3, $S(\alpha, t)=1.30$ 1.
769 5			
794 5			
829 ^b	(11/2 ⁻)		
840 3			
909 5			
936 4			
947 10			
986 8			
1134 8			
1158 6			
1186 8			
1229 ^c	(13/2 ⁺)	0.34 3	$S(^3\text{He}, d)=0.15$ 2, $S(\alpha, t)=0.34$ 3.
1311 5			
1347 7			
1390 6			

[†] From 1975Er01. The J^π and band assignments are based on cross-sections and $(\alpha, t)/(^3\text{He}, d)$ cross-section ratios which are sensitive for determining the angular momentum of levels populated. Previous assignments based on decay studies were also considered.

[‡] Band(A): 3/2[521].

[#] Band(B): 7/2[633].

[@] Band(C): 1/2[400].

[&] Band(D): 5/2[642].

^a Band(E): 5/2[523].

^b Band(F): 7/2[514].

^c Band(G): 9/2[624].

^d Consistent with low L transfer; possible $K^\pi=1/2^-$ band.

²⁴⁸Cm(α ,t),(³He,d) 1975Er01

Band(E): 5/2[523]

(11/2⁻) 682

Band(D): 5/2[642]

(13/2⁺) 599

(9/2⁻) 625

(9/2⁺) 483

Band(C): 1/2[400]

(3/2⁺,5/2⁺) 413

(1/2⁺) 377

Band(A): 3/2[521]

11/2⁻ 199

Band(B): 7/2[633]

13/2⁺ 155

9/2⁻ 130

7/2⁻ 83

9/2⁺,5/2⁻ 43

9/2⁺,5/2⁻ 43

3/2⁻ 7

7/2⁺ 0

²⁴⁸Cm(α ,t),(³He,d) 1975Er01 (continued)

Band(G): 9/2[624]	
<u>(13/2⁺)</u>	<u>1229</u>
Band(F): 7/2[514]	
<u>(11/2⁻)</u>	<u>829</u>

(9/2⁻) 750

²⁴⁹₉₇Bk₁₅₂