

⁸⁹Y(n,n') 1982Ya05,1969To03,1987Me10

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 114, 1 (2013)	20-Oct-2012

Includes (n,n) and (pol n,n).

1982Ya05: E=11 MeV, time-of-flight method, measured $\sigma(\theta)$, FWHM \approx 200 keV, DWBA analysis.

1969To03: E=1.6-3.8 MeV, time-of-flight method, measured $\sigma(E)$, excitation functions, Hauser-Feshbach analysis.

1987Me10: E=11 MeV. Measured $\sigma(\theta)$ for first three excited states, tof method.

1984Bu28: E=0.5-4.2 MeV, time-of-flight method, measured neutron spectra, $\sigma(\theta)$. Levels identified from neutron spectrum at 909, 1504, 1747, 2224, 2567, 2889 and 3104. Main level scheme studied by (n,n' γ).

Others:

2008Oh02: (n,n) E=96 MeV, measured $\sigma(\theta)$.

Additional information 1.

1993Sa41: E=14 MeV. Measured residual nuclide production.

1982Pi09: E=fast neutrons. Measured cross section for isomer production.

1971Ab08: E=3-18 MeV. Measured σ .

1968Pe19: E=15 MeV. Measured σ .

(n,n) only: 1990La24 (8 MeV), 1989Ag03 (10-740 keV), 1987Po10 (<300 keV), 1987Ol03 and 1986Ol02 (21.6 MeV), 1987Ko05 (E=143 keV), 1986Ha31 and 1985Ha02 (14.6 MeV), 1984Sm02 (1.5-4 MeV), 1981Ko19 (0.00051 to 5.19 eV), 1979Gl12 (slow neutrons), 1977Ca24, 1976Ni03, 1968Po05 (2,2.5,3,3.5 MeV).

(pol n,n) only: 1989Sc07 (7.75 MeV), 1986Ho20 and 1987HoZU (8-17 MeV), 1965Ke03 (3.3 MeV).

⁸⁹Y Levels

$$\beta_L' = [d\sigma/d\Omega(\text{exp}) / (d\sigma/d\Omega(\text{DWBA}))]^{1/2}.$$

E(level) [†]	J π [#]	L [‡]	β_L [@]	Comments
0	1/2 ⁻			
909	9/2 ⁺ ^b	5		E(level),L: from 1987Me10. L=4 (unnatural parity) contribution is not completely negligible (1987Me10).
1510	3/2 ⁻ ^b	2	0.079 13	L: L=1 contribution is negligible (1987Me10). $\beta_2' = 0.050$ 8 (1982Ya05).
1750	5/2 ⁻ ^b	2	0.079 10	L: L=3 contribution is negligible (1987Me10). $\beta_2' = 0.061$ 8 (1982Ya05).
2220	5/2 ⁺ ^b	3	0.160 17	$\beta_3' = 0.105$ 11 (1982Ya05).
2530 ^d	7/2 ⁺ ^b	3 ^d	0.14 3	$\beta_3' = 0.11$ 2 (1982Ya05).
2570 ^d	11/2 ⁺	5 ^d	0.06 & 1	$\beta_5'(2570+2620) = 0.06$ 1 (1982Ya05).
2620 ^d	9/2 ⁺ ^b	5 ^d	&	$\beta_5'(2570+2620) = 0.06$ 1 (1982Ya05).
2870 ^d	(7/2) ⁺	3 ^d	0.079 13	$\beta_3' = 0.06$ 1 (1982Ya05).
2880 ^d	(3/2) ⁻	2 ^d	0.087 16	$\beta_2' = 0.055$ 10 (1982Ya05).
3065 ^d	3/2 ⁻	2 ^d	a	
3105 ^d	(5/2) ⁻ ^c	2 ^d	0.065 ^a 8	$\beta_2' = 0.050$ 6 (1982Ya05). Additional information 2.
3137 ^d	(5/2) ⁻ ^c	2 ^d	a	

[†] From 1982Ya05, unless otherwise stated. Energies of 11 levels available from 1969To03 are in agreement with those from 1982Ya05. Energy uncertainty is 15 keV (1969To03).

[‡] From DWBA analysis of $\sigma(\theta)$ (1982Ya05). For first three excited states, values are also from 1987Me10.

[#] From Adopted Levels.

[@] Deformation parameter $\beta_L = [d\sigma/d\Omega(\text{exp}) / d\sigma/d\Omega(\text{DWBA})]^{1/2} \times [(2J_i+1)(2L+1) / (2J_f+1)]^{1/2}$ where $J_i = 1/2$, $J_f = \text{level spin}$

 $^{89}\text{Y}(\text{n},\text{n}') \quad \underline{1982\text{Ya05},1969\text{To03},1987\text{Me10}} \text{ (continued)}$ ^{89}Y Levels (continued)

- (1982Ya05). Deformation parameter $\beta_L' = [d\sigma/d\Omega(\text{exp})/(d\sigma/d\Omega(\text{DWBA}))]^{1/2}$ is given under comments for each level.
- [&] $[(\beta_L'(2570)^2 + \beta_L'(2620)^2)]^{1/2} = 0.06 \text{ l.}$
- ^a $[(\beta_L'(3065)^2 + \beta_L'(3105)^2 + \beta_L'(3137)^2)]^{1/2} = 0.050 \text{ } \sigma.$
- ^b Assigned J^π is consistent with Hauser-Feshbach analysis (1969To03).
- ^c Agreement with calculated cross section is better for $J=5/2$ (1984Bu28).
- ^d Unresolved doublet or triplet (1982Ya05).