

$^{172}\text{Yb}(\alpha, \alpha')$ **1987Go29**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 75,199 (1995)	31-May-1995

E=36 MeV. Enriched (97%) target. FWHM $\approx$ 18 keV. $\sigma(\theta)$ from 15° to 75° in 2.5° intervals. Coupled-channel calculations.

Other: **1981BuZN**: E=25 MeV. Results of this study are not available.

 ^{172}Yb Levels

The deformation parameters B_L 's are deduced (**1987Go29**) from a comparison of experimental and theoretical cross sections at different angles. Coupled-channel analyses with in the framework of rotational model are used to determine theoretical cross sections. The uncertainties are given only for 2⁺, 4⁺, and 6⁺ of the g.s. band. These values are highly model dependent, thus the uncertainties for other excited bands are not known.

E(level)	J^π [‡]	B(EL)(IS)(†) (L=J) [#]	Comments
0 [@]	0 ⁺		
79 [@] 5	2 ⁺	7.5 9	$\beta_2=+0.21$ 1. B(E2)(W.u.)(IS)=265.
260 [@] 5	4 ⁺	<0.010	$\beta_4=-0.028$ 4. B(E4)(W.u.)(IS)=0.05. B(E4)(IS)=0.0003 +97-3. Sign(matrix element)=-.
540 [@] 5	6 ⁺	<0.086	$\beta_6=0.000$ 2. B(E6)(W.u.)(IS)=4.1. B(E6)(IS)=0.004 +82-4. Sign(matrix element)=-.
912 ^{†@} 5	8 ⁺		
1042 ^{&} 5	0 ⁺		
1118 ^{†&} 5	2 ⁺	0.0015 5	$\beta_2=0.0033$. B(E2)(W.u.)(IS)=0.05.
1155 ^{†d} 5	1 ⁻		
1222 ^d 5	3 ⁻	0.016 3	$\beta_3=0.0132$. B(E3)(W.u.)(IS)=1.3.
1263 ^c 5	4 ⁺	0.036 7	$\beta_4=0.0182$. B(E4)(W.u.)(IS)=6.9.
1355 ^d 5	(5 ⁻)		
1466 ^a 5	2 ⁺	0.041 9	$\beta_2=0.014$. B(E2)(W.u.)(IS)=1.4.
1608 ^b 5	2 ⁺	0.012 3	$\beta_2=0.0077$. B(E2)(W.u.)(IS)=0.42.
1658 ^{†a} 5	4 ⁺	0.006 2	B(E4)(W.u.)(IS)=1.1.
1710 ^e 5	3 ⁻	0.0078 16	$\beta_3=0.0092$. B(E3)(W.u.)(IS)=0.63.
1803 ^{?b} 5	4 ⁺	≤ 0.012	B(E4)(W.u.)(IS) ≤ 2.2 .
1822 ^f 5	3 ⁻	0.065 13	$\beta_3=0.023$. B(E3)(W.u.)(IS)=5.2.
2030 ^g 5	3 ⁻	0.058 12	$\beta_3=0.0194$. B(E3)(W.u.)(IS)=4.7.
2184 [†] 5	(2 ⁺)	0.0019 4	B(E2)(W.u.)(IS)=0.07.
2255 [†] 5	(2 ⁺)	0.0029 6	$\beta_2=0.005$. B(E2)(W.u.)(IS)=0.1.
2367 [†] 5	(2 ⁺)	0.005 1	$\beta_2=0.0065$. B(E2)(W.u.)(IS)=0.18.
2465 5	(2 ⁺)	0.010 2	B(E2)(W.u.)(IS)=0.35.
2580 [†] 5	(2 ⁺)	0.0034 7	B(E2)(W.u.)(IS)=0.12.
2650 [†] 5	(2 ⁺)	0.0038 8	B(E2)(W.u.)(IS)=0.13.
2738 5	(2 ⁺)	0.012 3	$\beta_2=0.01$. B(E2)(W.u.)(IS)=0.42.
2836 [†] 5	(2 ⁺)	0.0072 15	B(E2)(W.u.)(IS)=0.25.
2890 [†] 5	(2 ⁺)	0.017 4	B(E2)(W.u.)(IS)=0.6.
2995 [†] 5	(2 ⁺)	0.0087 17	B(E2)(W.u.)(IS)=0.3.

[†] Weakly excited level. Energy uncertainty is 5 keV or more.

[‡] From **1987Go29**. These assignments are consistent with those in Adopted Levels for levels up to 1822. Above this the assignments are from **1987Go29** only, which seem to be based on the shape of $\sigma(\theta)$ distributions and comparison of experimental cross

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 $^{172}\text{Yb}(\alpha, \alpha')$ **1987Go29 (continued)**

 ^{172}Yb Levels (continued)

sections with calculated values.

The B(EL)(IS)($\uparrow$) are deduced (1987Go29) from B_L 's. The uncertainties are only statistical; from the experimental cross sections. The systematic errors due to model dependent B_L 's are not known. The corresponding B(EL)(W.u.)(IS) values are given under comments.

@ Band(A): $K^\pi=0^+$ g.s. band.

& Band(B): $K^\pi=0^+$ β band.

^a Band(C): $K^\pi=2^+$ band.

^b Band(D): $K^\pi=2^+$ band.

^c Band(E): $K^\pi=3^+$ band.

^d Band(F): $K^\pi=1^-$ band.

^e Band(G): $K^\pi=0^-$ band.

^f Band(H): $K^\pi=2^-$ band.

^g Band(I): $K^\pi=3^-$ band.

<u>$^{172}\text{Yb}(\alpha, \alpha')$ 1987Go29</u>	
Band(D): $K^\pi=2^+$ band	
<u>4⁺</u>	<u>1803</u>
Band(C): $K^\pi=2^+$ band	
<u>4⁺</u>	<u>1658</u>
	<u>2⁺</u> <u>1608</u>
<u>2⁺</u>	<u>1466</u>
Band(B): $K^\pi=0^+$ β band	
<u>2⁺</u>	<u>1118</u>
<u>0⁺</u>	<u>1042</u>
Band(A): $K^\pi=0^+$ g.s. band	
<u>8⁺</u>	<u>912</u>
<u>6⁺</u>	<u>540</u>
<u>4⁺</u>	<u>260</u>
<u>2⁺</u>	<u>79</u>
<u>0⁺</u>	<u>0</u>
Band(F): $K^\pi=1^-$ band	
(5 ⁻)	<u>1355</u>
Band(E): $K^\pi=3^+$ band	
<u>4⁺</u>	<u>1263</u>
3 ⁻	<u>1222</u>
1 ⁻	<u>1155</u>

 $^{172}\text{Yb}(\alpha, \alpha')$ **1987Go29 (continued)**

Band(G): $K^\pi=0^-$ band		Band(H): $K^\pi=2^-$ band		Band(I): $K^\pi=3^-$ band	
<u>3⁻</u>	<u>1710</u>	<u>3⁻</u>	<u>1822</u>	<u>3⁻</u>	<u>2030</u>

 $^{172}_{70}\text{Yb}_{102}$