

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen [#] and Balraj Singh		NDS 135, 1 (2016)	31-May-2016

$Q(\beta^-)=9.51\times 10^3$ 14; $S(n)=5.68\times 10^3$ 16; $S(p)=13.19\times 10^3$ 14; $Q(\alpha)=-12.67\times 10^3$ 17 2012Wa38

$S(2n)=13500$ 150, $S(2p)=31420$ 180, $Q(\beta^-n)=80$ 140 (2012Wa38).

1971Ar32: ^{42}Cl produced and identified in $^{232}\text{Th}(^{40}\text{Ar},X)$ reaction at 290 MeV, measured fragment yield.

1981Vo04: ^{42}Cl produced in $\text{U,Nb}(p,X)$ at 600 MeV, measured half-life.

1998WiZX, 1998WiZV, 1989Mi03, 1981HuZT: studies of ^{42}Cl β decay.

Mass measurements: 2015Xu14, 1991Zh24, 1990Tu01.

Cross-section and radius measurements: 2006Kh08, 2006Ro34, 1999Ai02.

Additional information 1.

1991Wa19: shell-model calculations, levels, binding energy, β -decay rates.

 ^{42}Cl LevelsCross Reference (XREF) Flags

- A ^{42}S β^- decay (1.016 s)
 B ^{43}S β^-n decay (265 ms)
 C $^{208}\text{Pb}(^{40}\text{Ar},X\gamma)$

E(level) [†]	J^π	$T_{1/2}$	XREF	Comments
0	$(2^-)^{\ddagger}$	6.8 s 3	A C	$\% \beta^- = 100$ J^π : (3^-) in 2006Wi10. $T_{1/2}$: from 1981Vo04. Mean radius $r_0^2=1.304$ fm ² 54 (2006Kh08).
118.19 6	$(3^-)^{\ddagger}$		A	J^π : (2^-) in 2006Wi10.
522? 1	$(4^-)^{\ddagger}$		C	
588.97 6	$(1^-, 2, 3^+)^{\#}$		A	
639.44 9	$(1^-, 2, 3^+)^{\#}$		A	
841.91 6	$(1^-, 2, 3^+)^{\#}$		A	
1025.82 23	$(1^-, 2, 3^+)^{\#}$		A	
1267.49 7	1^+		A	J^π : $\log ft=4.99$ from 0^+ .
1385.69 18			A	
1550.42 9			A	
1576.65? 20			A	
1684.22? 11			A	
1710.92 8			A	
1834.87? 13			A	
2123.31 8	1^+		A	J^π : $\log ft=4.13$ from 0^+ .
2221.03? 12			A	
2241.17 25	(1^+)		A	J^π : $\log ft=5.5$ from 0^+ , however, due to weak β feeding and incomplete decay scheme, J^π is considered as tentative.
2403.2? 4			A	
3029.71 11	1^+		A	J^π : $\log ft=4.33$ from 0^+ .

[†] From least-squares fit to E_γ data.

[‡] From shell-model calculations (2013Sz02).

[#] Inferred from a comparison with the decay scheme of ^{40}S (2006Wi10).

Adopted Levels, Gammas (continued)

$\gamma(^{42}\text{Cl})$						
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.
118.19	(3 ⁻)	118.25 10	100	0	(2 ⁻)	
522?	(4 ⁻)	522 [†] 1	100	0	(2 ⁻)	
588.97	(1 ⁻ ,2,3 ⁺)	470.78 6	100 4	118.19	(3 ⁻)	
		588.78 9	0.75 15	0	(2 ⁻)	
639.44	(1 ⁻ ,2,3 ⁺)	521.26 [†] 10	100 20	118.19	(3 ⁻)	
		638.9 4	28 5	0	(2 ⁻)	
841.91	(1 ⁻ ,2,3 ⁺)	202.42 11	2.6 3	639.44	(1 ⁻ ,2,3 ⁺)	
		252.6 [‡] 4	0.93 24	588.97	(1 ⁻ ,2,3 ⁺)	
		723.72 7	100 3	118.19	(3 ⁻)	
		841.95 8	25 3	0	(2 ⁻)	
1025.82	(1 ⁻ ,2,3 ⁺)	907.5 5	71 33	118.19	(3 ⁻)	
		1025.9 [‡] 4	100 31	0	(2 ⁻)	
1267.49	1 ⁺	425.61 6	44 3	841.91	(1 ⁻ ,2,3 ⁺)	
		678.43 7	100 6	588.97	(1 ⁻ ,2,3 ⁺)	
		1149.42 13	13 3	118.19	(3 ⁻)	
		1268.8 [‡] 7	12.8 19	0	(2 ⁻)	[M2]
1385.69		796.80 20	100	588.97	(1 ⁻ ,2,3 ⁺)	
1550.42		1550.52 14	100	0	(2 ⁻)	
1576.65?		1458.53 [‡] 23	100	118.19	(3 ⁻)	
1684.22?		1684.1 [‡] 3	100	0	(2 ⁻)	
1710.92		160.60 9	52 5	1550.42		
		685.1 3	41 4	1025.82	(1 ⁻ ,2,3 ⁺)	
		868.94 14	66 7	841.91	(1 ⁻ ,2,3 ⁺)	
		1071.6 3	43 10	639.44	(1 ⁻ ,2,3 ⁺)	
		1121.97 13	100 20	588.97	(1 ⁻ ,2,3 ⁺)	
		1592.55 18	65 7	118.19	(3 ⁻)	
1834.87?		1245.93 [‡] 24	100	588.97	(1 ⁻ ,2,3 ⁺)	
2123.31	1 ⁺	288.49 [‡] 12	1.93 24	1834.87?		
		439.09 [‡] 8	5.4 5	1684.22?		
		737.8 3	1.2 4	1385.69		
		1281.44 12	100 4	841.91	(1 ⁻ ,2,3 ⁺)	
		1534.26 11	34.0 16	588.97	(1 ⁻ ,2,3 ⁺)	
		2004.93 16	52.0 19	118.19	(3 ⁻)	
		2123.9 5	3.9 5	0	(2 ⁻)	[M2]
2221.03?		670.55 [‡] 10	100	1550.42		
2241.17	(1 ⁺)	1399.1 3	100 11	841.91	(1 ⁻ ,2,3 ⁺)	
		1652.4 4	45 15	588.97	(1 ⁻ ,2,3 ⁺)	
2403.2?		1814.2 [‡] 4	100	588.97	(1 ⁻ ,2,3 ⁺)	
3029.71	1 ⁺	808.55 [‡] 15	16.3 26	2221.03?		
		1193.1 [‡] 9	18 3	1834.87?		
		1318.88 11	100 4	1710.92		
		1453.2 [‡] 3	14.4 19	1576.65?		
		2187.2 4	29 3	841.91	(1 ⁻ ,2,3 ⁺)	
		2440.6 3	26 3	588.97	(1 ⁻ ,2,3 ⁺)	
		2911.7 5	20 3	118.19	(3 ⁻)	

[†] Note two γ rays of nearly the same energy.[‡] Placement of transition in the level scheme is uncertain.

