^{57}Cr β^- decay 1978Da04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. R. Bhat	NDS 85, 415 (1998)	24-Sep-1998

Parent: ^{57}Cr: E=0.0; J^π=3/2$^-$,5/2$^-$,7/2$^-$; $T_{1/2}$=21.1 s *10*; Q(β^-)=5.09×10^3 *9*; %β^- decay=100.0

Measured γ's, β's, 205.8γ(t), and $\gamma\gamma$- and $\beta\gamma$-coincidences; Ge(Li), scintillator; rabbit and helium-jet systems. 83γ and 850γ obscured by contaminants from ^{56}Cr and ^{56}Mn.

^{57}Mn Levels

Decay scheme constructed from $\gamma\gamma$-coincidence and singles data.

ΔE: Additional information 1.

E(level)†	J$^\pi$#	Comments
0.0	5/2$^-$	
83.39 *17*	5/2$^-$,7/2$^-$	J$^\pi$: 7/2$^-$.
850.16 *23*	3/2$^-$	
1055.87 *23*	1/2$^-$,3/2$^-$,5/2$^-$	J$^\pi$: (1/2$^-$).
1375.0 *4*	$^-$	J$^\pi$: 3/2,5/2.
1492.77 *21*	$^-$	J$^\pi$: 3/2,5/2.
1534.85 *25*	$^-$	J$^\pi$: ≤5/2$^-$.
1725.6 *6*	$^-$	J$^\pi$: 3/2,5/2.
1835.5 *4*	$^-$	
2146.9 *9*		J$^\pi$: 3/2,5/2.
2185.8 *4*		J$^\pi$: 1/2$^-$.
2232.9 *6*	5/2$^-$,7/2$^-$	J$^\pi$: (3/2$^-$).
2340.6 *4*	5/2$^+$,3/2$^+$	J$^\pi$: 3/2,5/2.
2493.3 *5*		J$^\pi$: 3/2$^-$,5/2$^-$.
2702.2 *3*	1/2$^-$ to 7/2$^-$	J$^\pi$: 3/2$^-$,5/2$^-$.

† Calculated using least-squares adjustment procedures; good agreement with 1978Da04.

‡ Additional information 1.

From Adopted Levels. Assignments suggested by 1978Da04 are given under comments. These suggested assignments are based on log *ft* and existence of γ's with the assumption that J^π(^{57}Cr)=3/2$^-$. The argument for J^π(^{57}Cr)=3/2$^-$ depends on the transition to the 2186 state. The evaluators do not adopt this argument since J(2186)=1/2 is based on a calculation (1978An10) in (α,p) and Δ(log ft) does not permit the statement that the transition is allowed.

β^- radiations

av Eβ: Additional information 2.

E(decay)†	E(level)	Iβ^-‡@	Log *ft*	Comments
(2.39×10^3 *9*)	2702.2	2.6 *13*	5.5 *2*	av Eβ≈8.6×10^2
(2.60×10^3 *9*)	2493.3	1.7 *9*	5.8 *2*	av Eβ≈9.6×10^2
(2.75×10^3 *9*)	2340.6	0.24 *22*	6.8 *4*	av Eβ≈1.03×10^3
(2.90×10^3 *9*)	2185.8	2.6 *14*	5.8 *2*	av Eβ≈1.11×10^3
(2.94×10^3 *9*)	2146.9	0.22 *14*	6.9 *3*	av Eβ≈1.12×10^3
3.28×10^3 *9*	1835.5	7. *4*	5.6 *3*	av Eβ≈1.27×10^3
(3.36×10^3 *9*)	1725.6	0.22 *13*	7.2 *3*	av Eβ≈1.33×10^3
3.54×10^3 *13*	1534.85	6. *3*	5.8 *2*	av Eβ≈1.42×10^3

Continued on next page (footnotes at end of table)

^{57}Cr β^- decay 1978Da04 (continued)

β^- radiations (continued)

E(decay)†	E(level)	Iβ⁻‡@	Log *ft*	Comments
(3.60×10³ *9*)	1492.77	0.8 *5*	6.7 *3*	av Eβ≈1.44×10³
(3.72×10³ *9*)	1375.0	0.4 *3*	7.1 *4*	av Eβ≈1.49×10³
(4.03×10³ *9*)	1055.87	2.2 *11*	6.5 *2*	av Eβ≈1.65×10³
(4.24×10³ *9*)	850.16	2.7 *23*	6.5 *4*	av Eβ≈1.75×10³
(5.09×10³ *9*)	0.0	74# *12*	5.45 *9*	av Eβ≈2.16×10³

† Additional information 3.
‡ Calculated from intensity balancing at each state, except as noted; in good agreement with 1978Da04 although ΔIβ are generally higher here.
# The ratio of accumulated ^{57}Cr to accumulated ^{57}Mn activity was obtained from the helium-jet run. $\sigma(^{57}Mn)/\sigma(^{57}Cr)$ was used to obtain the g.s. feeding. ΔIβ also reflects the uncertainty in the ratio of production σ′s.
@ Absolute intensity per 100 decays.

γ(^{57}Mn)

Iγ normalization: from ΣIγ(1+α) to g.s. and Iβ(to g.s.)= 74% *12*.
Identification made by $T_{1/2}$ or coincidence relationships.
Additional information 4.

E_γ	I_γ†&	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	α‡	Comments
83.4 *2*	160 *32*	83.39	5/2⁻,7/2⁻	0.0	5/2⁻	(M1)@	0.0508@	α(K)= 0.0449; α(L)=0.00443
205.8 *3*	56.2 *35*	1055.87	1/2⁻,3/2⁻,5/2⁻	850.16	3/2⁻	E2(+M1)		δ: ≥+0.2 if J=3/2; ≥+1 if J=5/2 from adopted gammas. Additional information 5.
342.9 *5*	9.5 *25*	1835.5	–	1492.77	–			
479.1 *5*	3.6 *14*	1534.85	–	1055.87	1/2⁻,3/2⁻,5/2⁻			
684.1 *5*	10.5 *42*	1534.85	–	850.16	3/2⁻			
766.5 *5*	6.7 *16*	850.16	3/2⁻	83.39	5/2⁻,7/2⁻			
850.2 *6*	157 *33*	850.16	3/2⁻	0.0	5/2⁻	E2(+M1)		δ: + 0.1 +*4*−*1* or ≤−5 from adopted gammas.
1055.8 *3*	16.3 *19*	1055.87	1/2⁻,3/2⁻,5/2⁻	0.0	5/2⁻			
1129.9 *3*	27.1 *25*	2185.8		1055.87	1/2⁻,3/2⁻,5/2⁻			
1209.2 *3*	11.3 *21*	2702.2	1/2⁻ to 7/2⁻	1492.77	–			
1292.2 *5*	14.6 *26*	1375.0	–	83.39	5/2⁻,7/2⁻			
1327.3 *3*	6.2 *33*	2702.2	1/2⁻ to 7/2⁻	1375.0	–			
1335.7 *5*	23. *10*	2185.8		850.16	3/2⁻			
1409.3 *3*	18.0 *29*	1492.77	–	83.39	5/2⁻,7/2⁻			
1492.7 *3*	18.5 *25*	1492.77	–	0.0	5/2⁻			
1535.0 *3*	94.7 *64*	1534.85	–	0.0	5/2⁻			
1642.2 *5*	4.2 *15*	1725.6	–	83.39	5/2⁻,7/2⁻			
1752.1 *5*	100	1835.5	–	83.39	5/2⁻,7/2⁻			
1835.2 *6*	26.8 *24*	1835.5	–	0.0	5/2⁻			
1852.0 *4*	23.0 *28*	2702.2	1/2⁻ to 7/2⁻	850.16	3/2⁻			
2063.5 *8*	4.3 *15*	2146.9		83.39	5/2⁻,7/2⁻			
2257.2 *9*	4.7 *34*	2340.6	5/2⁺,3/2⁺	83.39	5/2⁻,7/2⁻			
2410.0 *7*	16.9 *19*	2493.3		83.39	5/2⁻,7/2⁻			
2493.1 *7*	15.6 *14*	2493.3		0.0	5/2⁻			
2618.3 *8*	8.6 *27*	2702.2	1/2⁻ to 7/2⁻	83.39	5/2⁻,7/2⁻			

Continued on next page (footnotes at end of table)

^{57}Cr β^- decay 1978Da04 (continued)

$\gamma(^{57}Mn)$ (continued)

† Relative intensity. Some Iγ's had to be obtained from the 83γ coincidence spectrum because of low intensity or interference from other lines in the singles spectrum.
‡ Calculated using adopted Eγ.
# From adopted gammas.
@ Added on basis of comment by 1978Da04 that, theoretically, there was 5% conversion for this γ.
& For absolute intensity per 100 decays, multiply by 0.052 *25*.

^{57}Cr β^- decay 1978Da04

Decay Scheme

Intensities: Relative I_γ