^{62}Co β^- decay (13.86 min) 1970Jo12,1969Es03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Alan L. Nichols, Balraj Singh, Jagdish K. Tuli	NDS 113, 973 (2012)	15-Apr-2012

Parent: ^{62}Co: E=22 *5*; $J^\pi=(5)^+$; $T_{1/2}$=13.86 min *9*; Q(β^-)=5315 *20*; %β^- decay=99.5 *5*

^{62}Co-E,J^π,$T_{1/2}$: From Adopted Levels for ^{62}Co.

^{62}Co-Q(β^-): From 2011AuZZ, 2003Au03.

^{62}Co-%β^- decay: %IT<1.

1970Jo12: ^{62}Co from ^{64}Ni(d,α), enriched ^{64}Ni target, E=16 MeV, Ge(Li), plastic scintillator, identified ^{60}Cu, ^{61}Cu, ^{62}Cu and ^{61}Co as main impurities. Measured Eγ, Iγ, Eβ, Iβ, $\gamma\gamma$, $\beta\gamma$ coin, half-life of ^{62}Co isomer.

1969Es03: ^{62}Co from Ni(n,p), natural Ni target, E=14.5 MeV, Ge(Li) singles, NaI for $\gamma\gamma$. Measured Eγ, Iγ, $\gamma\gamma$.

1969Wa16: ^{62}Co from ^{62}Ni(n,p) and ^{65}Cu(n,α), 97.8% and 99.05% enriched ^{62}Ni target and natural Cu target, E=14.8 MeV, Ge(Li) singles, NaI for $\gamma\gamma$ and $\beta\gamma$ coincidences, plastic scintillator for $\beta\gamma$ coincidence. Measured Eγ, Iγ, Eβ, Iβ, $\gamma\gamma$ and $\beta\gamma$ coin, half-life of ^{62}Co isomer.

1969Mo04: ^{62}Co from Ni(p,^{3}He) and Ni(P,2P$_n$), 97.92% enriched ^{64}Ni, chemical separation of CO and Cu, Ge(Li) singles, Ge-NaI for $\gamma\gamma$ coincidences. Measured Eγ, Iγ, $\gamma\gamma$. Data for five γ rays.

1968Ki08: ^{62}Co from ^{62}Ni(n,p) and ^{65}Cu(n,α); measured Eγ, Iγ, Eβ. Ge(Li) detector for γ rays. Data for five γ rays.

1960Pr05: measured Eβ, half-life of ^{62}Co isomer.

1957Ga15: measured Eβ, Iβ, Eγ, Iγ, $\beta\gamma$ and $\gamma\gamma$ coin, half-life of ^{62}Co isomer.

1949Pa01: identified ^{62}Co isotope, measured Eβ, half-life of ^{62}Co isomer.

Other:

1975TiZW: ^{62}Co from ^{62}Ni(n,p), enriched ^{62}Ni target, fast neutrons, Ge(Li), scintillators; these authors report 13.9-min gammas connecting low-spin levels at 2048.6 (0^+) and 3861.1 (1,2) levels, as already known from other data, but their report is too brief for adoption in this evaluation.

Total decay energy of 5297 keV *44* deduced (by RADLIST code) from proposed decay scheme is in agreement with the expected value of 5310 keV *34*, indicating that decay scheme is complete.

^{62}Ni Levels

E(level)	J^π
0.0	0^+
1172.9 *2*	2^+
2301.9 *5*	2^+
2336.4 *3*	4^+
3176.7 *4*	4^+
3277.8 *4*	4^+
4055.2 *4*	4^+

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(1282 *21*)	4055.2	10.2 *6*	5.39 *4*	av Eβ= 486 *9* E(decay): 1.35×10^3 *20* (1969Wa16).
(2059 *21*)	3277.8	5.0 *4*	6.54 *4*	av Eβ= 841 *10* E(decay): 1.95×10^3 *10* (1969Wa16).
(2160 *21*)	3176.7	19.6 *6*	6.03 *2*	av Eβ= 888 *10*
(3001 *21*)	2336.4	64.0 *15*	6.125 *17*	av Eβ= 1286 *10* E(decay): 2.90×10^3 *10* (1969Wa16).

† β^- per 100 decays of 13.9-min ^{62}Co. Although intensity balances give a small amount of feeding to the 2301.9 level, this transition has not been included in the proposed decay scheme (second-forbidden unique transition).

‡ Absolute intensity per 100 decays.

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$\gamma(^{62}Ni)$

Iγ normalization: From Σ(I(γ+ce)) of gammas to g.s.=100, and total β^- branch >99%.

E_γ[‡]	I_γ[‡][b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	α[†]	Comments
777.5 *3*	1.8 *2*	4055.2	4^+	3277.8	4^+				
875.0 *4*	1.3 *2*	3176.7	4^+	2301.9	2^+	E2		3.36×10^{-4}	α(K)=3.02×10^{-4} *5*; α(L)=2.96×10^{-5} *5*; α(M)=4.17×10^{-6} *6*; α(N)=1.78×10^{-7} *3*
1128.9 *3*	1.3 *2*	2301.9	2^+	1172.9	2^+	M1+E2	+3.19 *11*	1.82×10^{-4}	α(K)=0.0001616 *23*; α(L)=1.579×10^{-5} *23*; α(M)=2.22×10^{-6} *4*; α(N)=9.57×10^{-8} *14*; α(IPF)=1.89×10^{-6} *3*
1163.5 *2*	72.1[#] *14*	2336.4	4^+	1172.9	2^+	E2		1.74×10^{-4}	α(K)=1.528×10^{-4} *22*; α(L)=1.493×10^{-5} *21*; α(M)=2.10×10^{-6} *3*; α(N)=9.05×10^{-8} *13*; α(IPF)=4.43×10^{-6} *8*
1172.9 *2*	100	1172.9	2^+	0.0	0^+	E2		1.72×10^{-4}	α(K)=1.501×10^{-4} *21*; α(L)=1.466×10^{-5} *21*; α(M)=2.06×10^{-6} *3*; α(N)=8.89×10^{-8} *13*; α(IPF)=5.39×10^{-6} *8*
1718.7 *5*	6.9 *5*	4055.2	4^+	2336.4	4^+				
1753.5[@] *8*	0.6 *2*	4055.2	4^+	2301.9	2^+				
2003.7 *3*	18.6 *6*	3176.7	4^+	1172.9	2^+	E2		3.70×10^{-4}	α(K)=5.09×10^{-5} *8*; α(L)=4.94×10^{-6} *7*; α(M)=6.96×10^{-7} *10*; α(N)=3.02×10^{-8} *5*; α(IPF)=3.14×10^{-4} *5*
2104.9 *3*	6.9 *4*	3277.8	4^+	1172.9	2^+				
2301.9 *5*	1.8 *2*	2301.9	2^+	0.0	0^+	E2		5.04×10^{-4}	α(K)=3.97×10^{-5} *6*; α(L)=3.85×10^{-6} *6*; α(M)=5.42×10^{-7} *8*; α(N)=2.35×10^{-8} *4*; α(IPF)=4.59×10^{-4} *7*
2882.3 *5*	1.12 *9*	4055.2	4^+	1172.9	2^+				
[x]3271.1[&] *10*	0.3 *1*								

[†] Additional information 1.
[‡] Weighted averages of values from 1968Ki08, 1969Es03, 1969Mo04 and 1970Jo12, except as noted.
[#] Unweighted average of values from 1968Ki08, 1969Es03, 1969Mo04 and 1970Jo12.
[@] From 1970Jo12, not reported by 1969Es03.
[&] From 1969Es03, not reported by 1970Jo12, although 1970Jo12 shows resulting double-escape peak (2248-keV line) attributed to the decay of the 13.86-min isomer.
[a] From Adopted Gammas.
[b] For absolute intensity per 100 decays, multiply by 0.977 *5*.
[x] γ ray not placed in level scheme.

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays