^{162}Gd β^- decay (8.4 min) 1982Ge07,1970Ch02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 195,1 (2024)	19-Sep-2023

Parent: ^{162}Gd: E=0; $J^\pi=0^+$; $T_{1/2}$=8.4 min *2*; Q(β^-)=1599 *4*; %β^- decay=100

^{162}Gd-$T_{1/2}$: From ^{162}Gd Adopted Levels and based on values of 8.2 min *3* (1970Ch02) and 8.55 min *28* (1982Ge07).

^{162}Gd-Q(β^-): From 2021Wa16.

1982Ge07: ^{162}Gd from ^{252}Cf spontaneous fission with radiochemistry. The γ-ray energies measured with Ge detector.

1970Ch02: ^{162}Gd from double-neutron capture in enriched (94.8%) ^{160}Gd with radiochemistry. The γ-ray energies measured with Ge and Si(Li) detectors and β particles with Si(Li) detector. γ(x ray) and $\gamma\beta$ coincidences measured.

1967Wa05: ^{162}Gd from double-neutron capture in enriched (94%) ^{160}Gd with radiochemistry. The γ rays measured with NaI(Tl) detectors.

^{162}Tb Levels

Decay scheme is from 1982Ge07 and is similar to that of 1970Ch02 and 1967Wa05.

The consistency of the scheme is supported by the fact that the sum of the energies of the radiations is 1580 keV *170*, which agrees with the Q value of 1599 *4*.

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	1^-	7.74 min *9*	$T_{1/2}$: from ^{162}Tb Adopted Levels.
39.10 *9*	2^-		
341.41 *9*	$(0^-,1)$		
442.11 *8*	1^+		

† From least-squares fit to γ energies.

‡ From ^{162}Tb Adopted Levels. Rotational-band and Nilsson configuration assignments are given there.

β^- radiations

E(decay)†	E(level)	Iβ^-‡#	Log *ft*	Comments
(1157 *4*)	442.11	95 *14*	4.70 *7*	av Eβ=401.9 *17* E(decay): measured value=1000 *100* (1970Ch02).
(1258 *4*)	341.41	4.3 *7*	6.18 *8*	av Eβ=443.4 *17*

† From 1970Ch02.

‡ From evaluator's assumption that 100% of the decays depopulate the levels at 341 and 442 keV (that is, no β^- feeding of the ground state and the 39 level) and no γ feeding of the 341-keV level. From log *ft*≥5.9 for the g.s. to g.s. β^- transition (1973Ra10), Iβ^-(0)≤13%; and from log f^1t≥8.5 for the β^- transition to the 2^- at 39 keV (1973Ra10), Iβ^-(39)≤0.15%.

Absolute intensity per 100 decays.

$\gamma(^{162}Tb)$

Iγ normalization: Based on evaluator's assumption that 100% of the decays depopulate the levels at 341 and 442 keV. From log *ft* arguments, the direct β^- feeding of the ground state should be ≤13%. If Iβ^-(0) were this large, the normalization factor would be reduced from 0.51 to 0.44. Normalization to 100% feeding of the ground state is not useful since Iγ(39) has a large (20%) uncertainty and the E2 mixture in this γ would have to be determined from the intensity balance at the 39 level in any case. 1982Ge07 report a normalization factor of 0.61 *6* based on a value of 43 *1* γ's per 100 decays for the 807-keV γ in the β^- decay of ^{162}Tb; but this results in a total β^- intensity of 118 *12* per 100 decays of ^{162}Gd. [Result reported by 1982Ge07 is Iγ(442γ from ^{162}Gd decay)/Iγ(807 γ from ^{162}Tb decay)=1.43 *2*].

Data are from 1982Ge07, unless otherwise noted. Others: 1970Ch02, 1967Wa05.

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^{162}Gd β^- decay (8.4 min) 1982Ge07,1970Ch02 (continued)

$\gamma(^{162}Tb)$ (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[†]	Comments
39.0 *2*	10 *2*	39.10	2^-	0.0	1^-	M1+E2	0.14 *+5−7*	7.9 *18*	%Iγ=5.1 *7* E_γ: average of 39.1 *2* (1982Ge07) and 38.8 *2* (1970Ch02). I_γ: average of 9 *2* (1982Ge07) and 14 *3* (1970Ch02). Mult.,α: α value deduced by evaluator (with code BrIccMixing) from intensity balance at 39 level from current decay scheme.
302.30 *15*	3.1 *5*	341.41	$(0^-,1)$	39.10	2^-				%Iγ=1.59 *33*
341.42 *10*	5.3 *5*	341.41	$(0^-,1)$	0.0	1^-				%Iγ=2.7 *4*
403.00 *8*	85 *4*	442.11	1^+	39.10	2^-	[E1]		0.00808 *11*	%Iγ=44 *6* α(K)=0.00687 *10*; α(L)=0.000946 *13*; α(M)=0.0002052 *29* α(N)=4.72×10^{-5} *7*; α(O)=7.15×10^{-6} *10*; α(P)=4.44×10^{-7} *6*
442.12 *8*	100.00 *1*	442.11	1^+	0.0	1^-	[E1]		0.00651 *9*	%Iγ=51 *7* α(K)=0.00554 *8*; α(L)=0.000759 *11*; α(M)=0.0001645 *23* α(N)=3.78×10^{-5} *5*; α(O)=5.75×10^{-6} *8*; α(P)=3.60×10^{-7} *5*

[†] Additional information 1.
[‡] For absolute intensity per 100 decays, multiply by 0.51 *7*.

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Decay Scheme

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