^{105}Rh β^- decay (35.3 h) 2010Kr05,1965Pi01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Lalkovski, J. Timar and Z. Elekes	NDS 161, 1 (2019)	1-Apr-2019

Parent: ^{105}Rh: E=0.0; $J^\pi=7/2^+$; $T_{1/2}$=35.341 h *19*; Q(β^-)=566.7 *24*; %β^- decay=100.0

^{105}Rh-$T_{1/2}$: weighted average of 35.357 h *37* and 35.319 h *24*, from γ(t) measurements performed respectively at room temperature and at T=19 K in 2009Go29, 35.47 h *8* in 1967ko?? and 35.4 h *1* 1965Pi01; Others: 35.88 h *2* (1962Br15);

2010Kr05: Facility: Oregon State University TRIGA reactor; Source: from a natural 5-20 mg Ru (^{104}Ru abundance is 18.6%) metal and RuO_2 powder samples, irradiated with thermal and epithermal neutrons; Detectors: flux monitors, one HPGe detector; Measured: γ, Eγ, Iγ.

2005Mo07: Facility: Kyoto University Research Reactor Institute; Source: chemically separrated from irradiated 0.1mg Ru sample enriched to 99.21% in ^{104}Ru; Detectors: 4$\pi\beta$, one HPGe detector; Measured: β-γ coinc., Iβ, Iγ, Eγ; Deduced: ^{105}Ru level scheme, Iγ normalization.

1967Sc01: Facility: McMaster nuclear reactor; Source: chemically separated from irradiated 100 μg ^{104}Ru target; Detectors: two NaI(Tl), several Ge(Li), magnetic spectrometer (Δp/p=0.5%) and a lens spectrometer (Δp/p≈3%); Measured: γ, β, β-γ and γ-γ coinc., Eγ, Iγ, Eβ, Iβ, I(ce).

1965Pi01: Facility: Univ. Michigan Ford Nuclear Reactor; Source: chemicaly separated from irradiated ^{105}Rh sample, enriched to 99.8% in ^{105}Rh; Detectors: NaI(Tl), Ge(Li), proportional counters, magnets and Pilot β scintillator; Measured: β, ce, γ, β-β , β-γ and γ-γ coinc.; Deduced: ^{105}Pd level scheme, α(K)exp.

1962Me07: Facility: Oak Ridge National Lab. Research Reactor; Source: mass-separated from 5-10 mg thick target eneriched to 98.16% in ^{104}Ru and exposed in a slow neutron flux 2.5x10^{14} n/cm^2.s; Detectors: ultracentrifuge, Pd and Ag scatterers, two PMT′s and a mirror, one NaI shielded by Pb in front; Measured: γ, $\gamma(\theta)$, Eγ; Deduced: δ, $T_{1/2}$.

Others: 2009Go29, 1977Wi10, 1976Ba39, 1974Be71, 1969Od01, 1964Ka23, 1962Br15, and 1967ko?? for Kobayashi in J.Inorg.Nucl.Chem.29 (1967) 1374.

^{105}Pd Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	$5/2^+$	stable	
280.522 *10*	$3/2^+$		
306.311 *10*	$7/2^+$		
319.233 *10*	$5/2^+$	40 ps *10*	$T_{1/2}$: from 250β^-315γ(t) in 1974Be71; Others: 51 ps *3* in 1962Me07.
442.418 *10*	$(7/2)^+$		

† From a least-squares fit to Eγ.
‡ From the Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-†	Log *ft*	Comments
(124.3 *24*)	442.418	0.0355 *8*	6.91 *3*	av Eβ=33.04 *68*
(247.5 *24*)	319.233	17.8 *6*	5.152 *20*	av Eβ=69.72 *75*
(260.4 *24*)	306.311	4.75 *10*	5.797 *16*	av Eβ=73.79 *76*
(286.2‡ *24*)	280.522	<0.01	>8.6	av Eβ=81.99 *78*
(566.7 *24*)	0.0	77.9 *5*	5.710 *7*	av Eβ=179.31 *89*

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

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$\gamma(^{105}Pd)$

Iγ normalization: from the intensity balance to the 306-keV level; Iβ=4.76 *5* in 2005Mo07 and I(γ+ce)$_{306\gamma}$.

E_γ[‡]	I_γ[‡@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[#]	α[†]	Comments
38.77 *7*	0.135 *2*	319.233	5/2$^+$	280.522	3/2$^+$	M1(+E2)		24 *18*	α(K)=12 *7*; α(L)=10 *10*; α(M)=1.9 *18*; α(N+..)=0.3 *3* α(N)=0.3 *3* α(N)=0.0200 *3* (1965Pi01) E_γ: 38.72 *3* in 1972De67; I_γ: from intensity balance to the 280-keV level. α(K)exp: 5.8 *6* (1965Pi01).
280.523 *10*	0.905 *9*	280.522	3/2$^+$	0.0	5/2$^+$	M1+E2	+0.143 *7*	0.0238	α(K)=0.0207 *3*; α(L)=0.00249 *4*; α(M)=0.000469 *7*; α(N+..)=7.89×10^{-5} *12* α(N)=7.89×10^{-5} *12* α(N)=7.81×10^{-5} *11* δ: +0.132 *8* (1977Wi10), +0.07 *7* (1976Ba39). α(K)exp=0.020 *4* (1965Pi01).
306.311 *10*	27.6 *3*	306.311	7/2$^+$	0.0	5/2$^+$	M1+E2	+0.055 *2*	0.0188	α(K)=0.01640 *23*; α(L)=0.00196 *3*; α(M)=0.000368 *6*; α(N+..)=6.20×10^{-5} *9* α(N)=6.20×10^{-5} *9* δ: Other: +0.055 *2* (1976Ba39) and 0.06 *1* (1977Wi10). α(K)exp: 0.016 *2* from Ice/Iγ and comparison with low energy Iβ (1964Ka23).
319.231 *10*	100.0 *10*	319.233	5/2$^+$	0.0	5/2$^+$	M1+E2	+0.103 *8*	0.01697	α(K)exp=0.013 *2*; K/L=8 *1* α(K)=0.01481 *21*; α(L)=0.001769 *25*; α(M)=0.000332 *5*; α(N+..)=5.60×10^{-5} *8* α(N)=5.60×10^{-5} *8* δ: from the adopted gammas; Others: +0.11 *1* (1977Wi10), +0.091 *13* or +1.35 *3* (1976Ba39), −0.11 (1962Me07). α(K)exp: From Ice/Iγ and comparison with low-energy Iβ (1964Ka23).
442.417 *10*	0.210 *2*	442.418	(7/2)$^+$	0.0	5/2$^+$	M1+E2	−0.23 *6*	0.00756 *11*	α=0.00756 *11*; α(K)=0.00660 *10*; α(L)=0.000783 *12*; α(M)=0.0001470 *23*; α(N+..)=2.48×10^{-5} α(N)=2.48×10^{-5} *4* δ: From the adopted

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$\gamma(^{105}Pd)$ (continued)

E_γ[‡]	E_i(level)	Comments
		gammas; Others: −0.8 *+7−4* (1976Ba39), −0.2 or −0.3 (1977Wi10).

† Additional information 1.
‡ From 2010Kr05, unless otherwise noted.
# From the adopted gammas.
@ For absolute intensity per 100 decays, multiply by 0.169 *3*.

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Decay Scheme

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