^{190}W β^- decay (30.0 min) 1976Ha39

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, [1] and Jun Chen[2]	NDS 169, 1 (2020)	15-Oct-2020

Parent: ^{190}W: E=0.0; $J^\pi=0^+$; $T_{1/2}$=30.0 min *15*; Q(β^-)=1200 *40*; %β^- decay=100.0

^{190}W-$T_{1/2}$: From β-decay curve (1976Ha39), recommended in ^{190}W Adopted Levels.

^{190}W-Q(β^-): From ^{190}W Adopted Levels. Other: 1250 *60* from 2017Wa10.

1976Ha39: sources of ^{190}W were produced via the (n,2pn) and (p,3p) reactions by the irradiation of isotopically enriched (98%) ^{192}O metal with E=25-200 MeV neutrons from the MEIN facility at BNL and E=92 MeV protons from the Brookhaven Linac injector of the alternating gradient synchrotron (AGS). γ rays were detected with a 50-cm^3 Ge(Li) detector and β particles were detected with a plastic scintillator. Measured Eγ, Iγ, β, $\beta\gamma$-coin, x-ray. Deduced levels, J, π, parent $T_{1/2}$, configurations, log *ft*, γ-ray multipolarities. Comparisons with theoretical calculations.

^{190}Re Levels

E(level)[†]	J^π[‡]	Comments
0.0	$(2)^-$	
162.1 *1*	(0^+)	$T_{1/2}$: >0.94 μs (from RUL(M2)<1).
319.7 *2*	1^+	

[†] Based on observed (950β)(157γ) coin. The 157γ-162γ cascade is based on intensity balance with known γ rays from 3.1-min ^{190}Re decay in equilibrium. Also Q(β^-) deduced from the proposed cascade agrees well with that deduced from mass calculations.

[‡] From the Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-[†]	Log *ft*	Comments
(8.8×10^2 *4*)	319.7	≈100	≈5.0	av Eβ=310 *30* Iβ^-,Log *ft*: the decay is considered as incomplete by the evaluators, thus the β feeding is considered as apparent (upper limits), and associated log *ft* values as lower limit. E(decay): 950 *70* (1976Ha39).
(1.20×10^3[‡] *4*)	0.0	<0.6	>8.4[1u]	

[†] Absolute intensity per 100 decays.

[‡] Existence of this branch is questionable.

γ(^{190}Re)

Iγ normalization: From known γ rays from the decay of 3.1-min ^{190}Re in secular equilibrium with ^{190}W. β^- feeding to g.s. is expected to be <0.6% (from log $f^{1u}t$>8.5) if J^π(^{190}Re g.s.)=2^-.

E$_\gamma$[†]	I$_\gamma$[†#]	E$_i$(level)	J_i^π	E$_f$	J_f^π	Mult.[‡]	α[@]	Comments
157.6 *1*	39 *4*	319.7	1^+	162.1	(0^+)	(M1)	1.414	α(K)=1.172 *17*; α(L)=0.187 *3*; α(M)=0.0428 *6* α(N)=0.01039 *15*; α(O)=0.001746 *25*; α(P)=0.0001277 *18*
162.1 *1*	11 *1*	162.1	(0^+)	0.0	$(2)^-$	(M2)	7.85	α(K)=5.81 *9*; α(L)=1.558 *23*; α(M)=0.380 *6* α(N)=0.0928 *14*; α(O)=0.01527 *22*; α(P)=0.000984 *14*

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^{190}W β^- decay (30.0 min) 1976Ha39 (continued)

$\gamma(^{190}Re)$ (continued)

† From 1976Ha39.
‡ Proposed by 1976Ha39 from intensity balance, assuming 157γ and 162γ are in a cascade. However, deduced I(K vacancies)=118 *12* disagrees with measured value of 77 *7* (1976Ha39).
# Absolute intensity per 100 decays.
@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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Decay Scheme

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