^{180}Os ε decay 1968Ha39,1968Ko10

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 126, 151 (2015)	1-Feb-2015

Parent: ^{180}Os: E=0.0; $J^\pi=0^+$; $T_{1/2}$=21.5 min *4*; Q(ε)=1475 *27*; %ε+%$β^+$ decay=100.0

1968Ha39: ^{180}Os activity produced in ^{182}W(α,6n), E(α)=75 MeV. Measured E(ce), I(ce) using permanent magnet spectrograph and x-ray film.

1968Ko10: ^{180}Os activity produced in ^{184}W(^{3}He,7n), E(^{3}He)=70 MeV. Measured Eγ, Iγ, γγ, γ(t) using Si(Li) and NaI(Tl) detectors.

Other: 1967Ho12, observed no γ-rays with Eγ>40 keV in the decay of ^{180}Os.

A total energy release of 700 keV *60* is calculated for the decay scheme using the RADLST code, compared with Q=1475 keV *27*, indicating the decay scheme is incomplete.

α: Additional information 1.

^{180}Re Levels

Level scheme is that proposed by 1968Ha39 and should be considered tentative.

E(level)	J^π †	$T_{1/2}$	Comments
0.0‡	$(1)^-$	2.46 min *3*	$T_{1/2}$: from the Adopted Levels.
20.1# *1*	1^+	87.5 ns *27*	$T_{1/2}$: from γγ(t) with K x-ray-20.1γ (1968Ko10).
49.8‡	$(2)^-$		
74.6#	$(2)^+$		
218.2			
249.9			
349.2			
401.8			
668.6			
717.0			

† From the Adopted Levels.
‡ Band(A): $K^\pi=1^-$ band. Probable configuration=((ν7/2[514])-(π5/2[402]).
# Band(B): $K^\pi=1^+$ band. Probable configuration=((π9/2[514])-(ν7/2[514])).

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments
(1.45×10^3 *3*)	20.1	<0.063	<99.9	>4.7	<100	av Eβ=214 *13*; εK=0.8130 *2*; εL=0.14188 *21*; εM+=0.04450 *8*

† Absolute intensity per 100 decays.

γ(^{180}Re)

Iγ normalization: From (K x-ray(Re)+K x-ray(W))/20.1γ=10.2 *18* for a ^{180}Os source in equilibrium with ^{180}Re (1968Ko10) and assuming that ^{180}Re decays 92.8% by electron capture to ^{180}W, and using theoretical εK(exp)/ε ratios and γ-ray conversion coefficients. The normalization factor is consistent with 100% ε feeding to the 20-keV level.

K x-ray intensity=79.1%, L x-ray intensity=33% *12* (1968Ko10). K x-ray intensity=84.6% *90* (1967Ho12).

Continued on next page (footnotes at end of table)

^{180}Os ε decay 1968Ha39,1968Ko10 (continued)

γ(^{180}Re) (continued)

E_γ	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α	Comments
20.1 *1*	100	20.1	1^+	0.0	$(1)^-$	E1	5.80 *12*	α(L)=4.45 *9*; α(M)=1.065 *21*; α(N)=0.244 *5*; α(O)=0.0327 *7*; α(P)=0.000854 *15* Mult.: from α(L)exp≤6 (1968Ko10), and ce(M1):ce(M2):ce(M3):ce(M4)+ce(M5)=7.0:7.5:10:5.6 (1968Ha39).
31.6		249.9		218.2				
48.2		717.0		668.6				
49.8		49.8	$(2)^-$	0.0	$(1)^-$	M1	6.82	α(L)=5.27 *8*; α(M)=1.205 *17*; α(N)=0.292 *4*; α(O)=0.0490 *7*; α(P)=0.00358 *5* Mult.: from ce(L1):ce(L2):ce(L3)=75:10:weak (1968Ha39).
54.4		74.6	$(2)^+$	20.1	1^+	M1	5.26	α(L)=4.06 *6*; α(M)=0.929 *13*; α(N)=0.225 *4*; α(O)=0.0378 *6*; α(P)=0.00276 *4* Mult.: from ce(L1):ce(L2):ce(L3):ce(M)=50:≈5:weak:15 (1968Ha39).
74.6		74.6	$(2)^+$	0.0	$(1)^-$	E1	0.800	α(K)=0.640 *9*; α(L)=0.1238 *18*; α(M)=0.0285 *4*; α(N)=0.00674 *10*; α(O)=0.001036 *15* α(P)=4.78×10^{-5} *7* Mult.: from ce(L1):ce(L2):ce(M)=9:3:4 (1968Ha39).
[x]104.0								
[x]107.0								
[x]113.7								
183.8		401.8		218.2				
200.1		249.9		49.8	$(2)^-$			
218.2		218.2		0.0	$(1)^-$			
250.0		249.9		0.0	$(1)^-$			
319.4		668.6		349.2				
329.0		349.2		20.1	1^+			
349.1		349.2		0.0	$(1)^-$			
401.5		401.8		0.0	$(1)^-$			
450.4		668.6		218.2				
[x]485.7								
667.0		717.0		49.8	$(2)^-$			
717.4		717.0		0.0	$(1)^-$			

† For absolute intensity per 100 decays, multiply by 0.17 *4*.

[x] γ ray not placed in level scheme.

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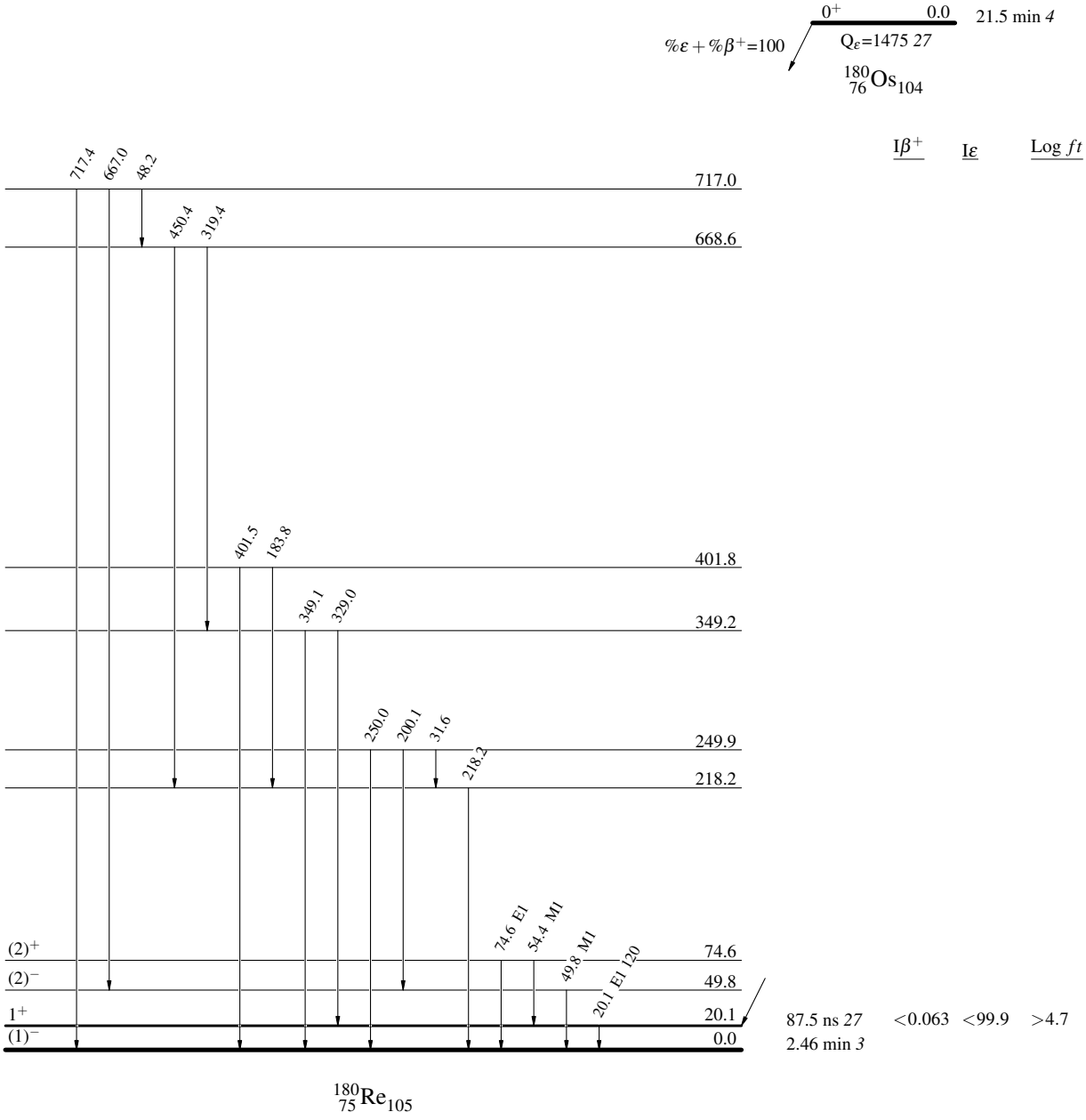
Decay Scheme

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



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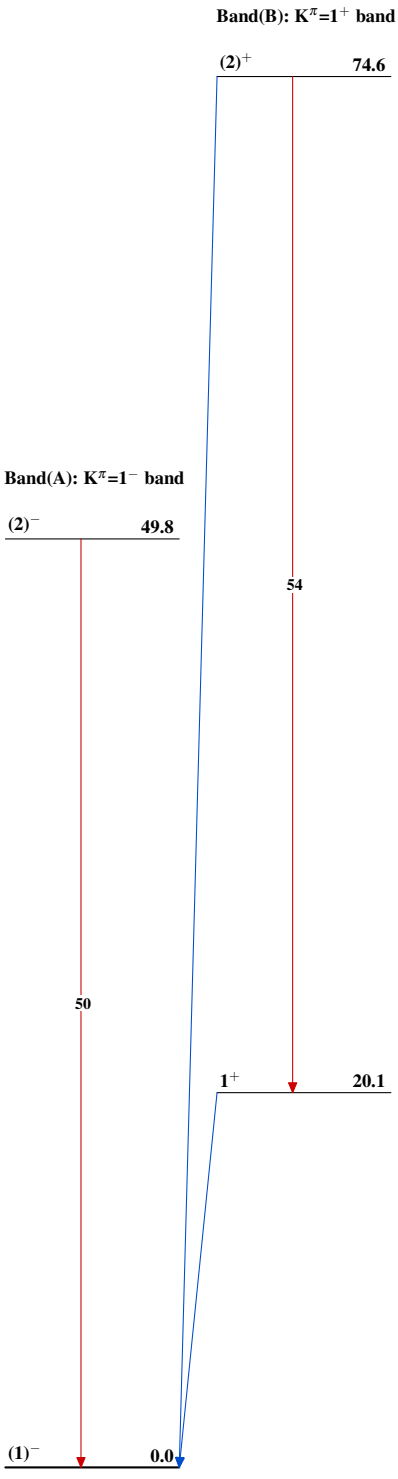

$^{180}_{75}Re_{105}$