^{191}Os IT decay (13.10 h) 1966Ma50,1973Lo03,1975Ca03

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 195,368 (2024)	1-Dec-2023

Parent: ^{191}Os: E=74.382 *3*; $J^{\pi}=3/2^{-}$; $T_{1/2}$=13.10 h *5*; %IT decay=100

The IT lowest multipole component is strongly hindered, hence the corresponding ce spectrum shows strong nuclear penetration effects in the ce subshell ratios. Additionally, the IT energy is only 0.5 keV greater than the K-shell electron binding energy.

The experiments were troubled by the mixing of m- and g-state activities, the weakness of the 74.38γ transition, and the important self-absorption of x- and γ-rays in the sources; however, the data from the lastest measurements make a consistent set.

^{191}Os Levels

E(level)	J^{π}[#]	$T_{1/2}$[#]	Comments
0.0[†]	$9/2^{-}$	14.99 d *2*	
74.38[‡] *1*	$3/2^{-}$	13.10 h *5*	No β^{-} decay observed (<5%) (1952Sw57). Other: 1963Pl01.

[†] Band(A): 9/2(505) g.s. rotational band.
[‡] Band(B): 3/2(512) rotational band.
[#] From Adopted Levels.

$\gamma(^{191}Os)$

Iγ normalization: From I(γ+ce)=100% and α=1647 *25*.

ce: ce(L1)/ce(L2) exp=4.63 *5*, ce(L1)/ce(L3) exp=0.495 *4*, ce(L2)/ce(L3) exp=0.107 *1*, ce(M1)/ce(M2) exp=4.49 *16*, ce(M1)/ce(M3) exp=0.487 *4*, ce(M2)/ce(M3) exp=0.107 *4*, ce(M4)+ce(M5)/ce(M3) exp=0.039 *2*, ce(N1)/ce(N2) exp=4.32 *34*, ce(N1)/ce(N3) exp=0.50 *2*, ce(N2)/ce(N3) exp=0.118 *9*, ce(N4)+ce(N5)/ce(N3) exp=0.036 *3*, ce(O)+ce(p)/ce(N3) exp=0.30 *3*, s (1973Lo03). ce(L1)/ce(L2) exp=4.35 *12*, ce(L1)/ce(L3) exp=0.490 *10*, ce(L2)/ce(L3) exp=0.113 *4* (1984Se19 reanalysis of 1966Ma50 data); ce(M1):ce(M2):ce(M3):ce(M4):ce(M5):ce(L3) exp=16:5:34:1.0:1.0:100 (1966Ma50; ce(L) superseded by 1984Se19). ce(L1):ce(L2):ce(L3):ce(M1):ce(M2):ce(M3):ce(M4)+ce(M5):ce(N)+ce(O) exp=51.0 *35*:10.9 *8*:100:17.8 *18*:7.7 *6*:33.0 *17*:3.4 *3*:17.6 *11* (1966Pl02).

α(74.38γ): α(K)exp=119 *12*, from ce(K)/ce(L) exp=0.135 using an L-fluorescence yield ω(L)=0.307 *15*; measured x-rays, Ge(Li), Si(Li) (1975Ca03; supersedes 1971Ca11); α(K)exp=106 *11*, using K-fluorescence yield ω(K)=0.95, and I(Kα_1 x ray)/I(K x ray)=0.50; measured x-rays and 74.38γ, cryst (1973Lo06). α(K)exp=131 *12*; α=1650 *150* from ^{191}Os g-state activity growth, measured x-rays, γ, Ge(Li) (1972Ki09; supersedes 1970Ki03).

E_{γ}	I_{γ}[†]	E_i(level)	J_i^{π}	E_f	J_f^{π}	Mult.	δ	α[‡]	Comments
74.38 *1*	100	74.38	$3/2^{-}$	0.0	$9/2^{-}$	M3+E4	0.077 *7*	1647 *25*	E_{γ}: From 1966Ma50. Other value: 74.37 *2* (1966Pl02). Others: 1952Sw57, 1958Na15, 1963Pl01. Mult.: From ce(L1):ce(L2):ce(L3) exp=49.2 *9*:10.74 *10*:100, weighted average of 1973Lo03, 1984Se19, and 1966Pl02; see comments under the heading for detailed experimental data. δ: From ce data of 1966Pi02 (except M2/L3, M3/L3, M45/L3), 1973Lo03, 1984Se19, and 1991Bo35 (n,γ) using the BrIccMixing code (v2.3d) (2023KiZX). Others: δ=0.07 *1* (1966Pl02 − from %E4=0.5 *1*); δ=0.055 *5* (1973Lo03 from %E4=0.30 *3*); δ=0.059 *4* (1984Se19 − from ce(L) sub-shell ratios). α: From 2023KiZX using the BrIcc code (version not released yet) − consistent with the α(exp)

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$\gamma(^{191}Os)$ (continued)

E_γ	E_i(level)	Comments
		data in 1991Bo35 (n,γ) and 1972Ki09, compared to the calculated value in 1973Lo03 − implying nuclear penetration effect (proposed in 1973Lo03 and 1984Se19) is negligible. Others: α(exp)=1650 *150* (1972Ki09); α(exp)≈1685 (1991Bo35 (n,γ) − from the reported α(exp)=1544 *117* (without α(K)) + expected α(K)≈140); α=1370 *40* (1973Lo03 − from α(K)=117 *4*, α(L)=904 *27*, α(M)=267 *8*, α(N+..)=79 *3*, calculated by 1973Lo03 using static conversion and dynamic correction coefficients for an M3 transition, an experimental nuclear penetration parameter λ=9.4 *5*, and δ=0.055 *5*). All references, except 1991Bo35, are related to this dataset. Others: 1952Sw57, 1963Pl01, 1970Ki03, 1971Ca11.

† For absolute intensity per 100 decays, multiply by 6.07×10^{-4} *9*.

‡ 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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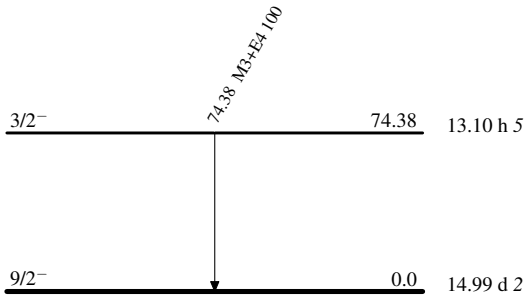
Decay Scheme

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

%IT=100



$^{191}_{76}Os_{115}$

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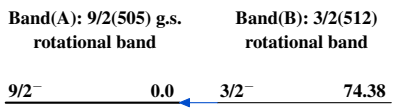

$^{191}_{76}Os_{115}$