^{174}Ir ε decay (7.9 s+4.9 s) 1994Ki01,1992Bo21,1992Sc16

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, Huo Junde	NDS 87, 15 (1999)	1-Nov-1998

Parent: ^{174}Ir: E=0.0; $J^\pi=(3^+)$; $T_{1/2}$=7.9 s *6*; Q(ε)=9.0×10^3; %ε+%β^+ decay=99.5

Parent: ^{174}Ir: E=193 *11*; $J^\pi=(7^+)$; $T_{1/2}$=4.9 s *3*; Q(ε)=9.0×10^3; %ε+%β^+ decay=97.5

1994Ki01: ^{174}Ir activity produced by ^{144}Sm(^{33}S,p2n), E=153 MeV. Measured Eγ, Iγ, $\gamma\gamma$ coin, $\gamma\gamma(\theta)$, Ice. Deduced conversion coefficients, angular correlation coefficients, γ-ray multipolarities and mixing ratios. Detectors: Compton-suppressed array of 6 hyperpure germanium detectors, magnetic spectrometer.

1992Bo21: ^{174}Ir activity produced by ^{144}Sm(^{32}S,pn), E=21 MeV, using an 88.6% enriched ^{144}Sm target. Measured Eγ, Iγ, $\gamma\gamma$ coin. Detectors: hyperpure germanium. The 342-keV γ ray decays with $T_{1/2}$=5.1 *5* s, whereas the 532-keV γ ray with $T_{1/2}$=7.7 *8* s (1992Bo21). The authors interpreted these results by assuming the existence of two isomers. A high-spin isomer (J≥5) with $T_{1/2}$=5.0 *4* s, and a low-spin isomer (J=2,3) with $T_{1/2}$=7.8 *6* s.

1992Sc16: activity produced by ^{141}Pr(^{36}Ar,3n), E=234 MeV. Measured Eγ, Iγ, $\gamma\gamma$ coin. Detected Os K-x rays. Measured Eα, Iα, $T_{1/2}$. Detectors: semiconductor for α's, hyperpure germanium for γ rays. Two isomers were observed from the decay of individual α-particle groups and γ rays: 4.9 *3* s (E=193 keV *11*, $J^\pi=(7^+)$, %ε=97.5 *3*, %α=2.5 *3*) and 9 *2* s (E=0.0, $J^\pi=(3^+)$, %ε=99.6, %α=0.4).

^{174}Os Levels

E(level)[&]	J$^\pi$[a]	E(level)[&]	J$^\pi$[a]	E(level)[&]	J$^\pi$[a]	E(level)[&]	J$^\pi$[a]
0.0[†]	0^+	777.5[†] *4*	6^+	1254.1[#] *8*	4^+	1596.0[@] *5*	(5^-)
158.51[†] *20*	2^+	846.2[#] *7*	2^+	1420.1[@] *5*	(3^-)	1617.3[†] *11*	10^+
434.9[†] *3*	4^+	989.4[‡] *5*	4^+	1424.9[‡] *7*	6^+	1789.4[@] *5*	(6^-)
545.3[‡] *6*	0^+	1054.0[#] *4*	3^+	1452.4[#] *5*	5^+	1860.2[@] *6*	(7^-)
690.9[‡] *3*	2^+	1171.7[†] *4*	8^+	1549.0[@] *5*	(4^-)		

[†] Band(A): $K^\pi=0^+$ g.s. rotational band.
[‡] Band(B): $K^\pi=0^+$ β vibrational band.
[#] Band(C): $K^\pi=2^+$ γ-vibrational band.
[@] Band(D): $K^\pi=(3^-)$ rotational band.
[&] Deduced by evaluator from a least-squares fit to γ-ray energies.
[a] J^π assignments are based on γ-ray multipolarities, $\gamma\gamma(\theta)$, γ-ray decay patterns, and rotational structure (1994Ki01).

^{174}Ir ε decay (7.9 s+4.9 s) 1994Ki01,1992Bo21,1992Sc16 (continued)

γ(^{174}Os)

Evaluator did not deduce the decay-scheme normalization because ε feeding to g.s. is unknown.

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α #	Comments
145.8	2.1 *7*	690.9	2^+	545.3	0^+				
158.5 *2*	909 *28*	158.51	2^+	0.0	0^+	E2		0.760	α(K)= 0.311; α(L)= 0.337; α(M)= 0.0863; α(N+..)= 0.0257 E_γ: average of 158.7 keV *2* (1992Bo21) and 158.6 keV *2* (1992Sc16). Other value: 158.6 (1994Ki01).
193.3	5.6 *14*	1789.4	(6^-)	1596.0	(5^-)				
240.4	28 *4*	1789.4	(6^-)	1549.0	(4^-)				
256.2	8 *2*	690.9	2^+	434.9	4^+				
263.8	15 *2*	1860.2	(7^-)	1596.0	(5^-)				
276.3 *2*	1000 *21*	434.9	4^+	158.51	2^+	E2		0.118	α(K)= 0.0735; α(L)= 0.0339; α(M)= 0.00847; α(N+..)= 0.00198 E_γ: average of 276.4 keV *2* (1992Bo21) and 276.3 keV *2* (1992Sc16). Other value: 276.3 keV (1994Ki01). Mult.: from α(L)exp=0.035 *3*, α(M)exp=0.0099 *12* (1994Ki01).
298.4	45 *5*	989.4	4^+	690.9	2^+				
337.0	18 *3*	1789.4	(6^-)	1452.4	5^+				
342.6 *2*	627 *14*	777.5	6^+	434.9	4^+	E2		0.0616	α(K)= 0.0425; α(L)= 0.0153; α(M)= 0.00304; α(N+..)= 0.000776 E_γ: average of 342.8 keV *2* (1992Bo21) and 342.3 keV *2* (1994Ki01). Other value: 342.3 keV (1994Ki01). Mult.: from α(K)exp=0.040 *3*, 0.014 *2* (1994Ki01).
386.8	43 *4*	545.3	0^+	158.51	2^+	E2		0.0439	α(K)= 0.0315; α(L)= 0.01000; α(M)= 0.00184; α(N+..)= 0.000509 Mult.: from α(K)exp=0.05 *2*; A_{22}=+0.39 *14*, A_{44}=1.10 *19* (1994Ki01).
394.2 *2*	148 *7*	1171.7	8^+	777.5	6^+	E2		0.0417	α(K)= 0.0301; α(L)= 0.00938; α(M)= 0.00172; α(N+..)= 0.000481 E_γ: average of 394.4 keV *2* (1992Bo21) and 393.9 keV *2* (1992Sc16). Other value: 394.0 keV (1994Ki01). Mult.: from α(K)exp=0.032 *7* (1994Ki01).
435.5	17 *3*	1424.9	6^+	989.4	4^+	E2		0.0321	α(K)= 0.0237; α(L)= 0.00675; α(M)= 0.00128; α(N+..)= 0.000377 Mult.: from α(K)exp=0.026 *7* (1994Ki01).
445.6	16 *6*	1617.3	10^+	1171.7	8^+				
495.1	14 *4*	1549.0	(4^-)	1054.0	3^+				
532.4 *2*	27 *3*	690.9	2^+	158.51	2^+	E0+E2+M1	−10 +*3*−*5*		E_γ: average of 532.4 keV *2* (1992Bo21) and 532.4 keV *2* (1992Sc16). Other value: 532.4 keV (1994Ki01). Mult.: from α(K)exp=0.120 *9*, α(L)exp=0.020 *2*, 0.0063 *16*; A_{22}=+0.00 *12*, A_{44}=0.30 *12* in γγ(θ) (1994Ki01).
545.5		545.3	0^+	0.0	0^+	E0			Mult.: from ce(K)/ce(L)=5.4 *13* (1994Ki01).

$^{174}_{76}Os_{98}$-2

^{174}Ir ε decay (7.9 s+4.9 s) 1994Ki01,1992Bo21,1992Sc16 (continued)

$\gamma(^{174}Os)$ (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α [#]	Comments
554.5 *5*	42 *4*	989.4	4^+	434.9	4^+	E0+E2+M1	−2.8 *+7−12*		E_γ: average of 554.5 keV *5* (1992Bo21) and 554.5 keV (1994Ki01). Mult.,δ: from α(K)exp=0.069 *8*, α(L)exp=0.014 *3*; A_{22}=+0.01 *8*, A_{44}=+0.20 *10* in $\gamma\gamma(\theta)$ (1994Ki01).
559.7	7.1 *14*	1549.0	(4^-)	989.4	4^+				
574.2	4.9 *14*	1420.1	(3^-)	846.2	2^+				
606.7	13 *3*	1596.0	(5^-)	989.4	4^+				
618.9	7 *2*	1054.0	3^+	434.9	4^+				
647.6	36 *4*	1424.9	6^+	777.5	6^+	E0+E2(+M1)	≤−3		Mult.,δ: from α(K)exp=0.044 *10*; A_{22}=+0.0 *1*, A_{44}=+0.13 *7* in $\gamma\gamma(\theta)$ (1994Ki01).
675.1	9 *3*	1452.4	5^+	777.5	6^+				
687.9	12 *2*	846.2	2^+	158.51	2^+	E0+E2+M1	8 *3*		Mult.,δ: from α(K)exp=0.014 *4*; A_{22}=−0.06 *11*, A_{44}=+012 *11* in $\gamma\gamma(\theta)$ (1994Ki01).
688.5 *5*	70 *4*	1860.2	(7^-)	1171.7	8^+	[E1]		0.00399	α(K)= 0.00334; α(L)= 0.000488 E_γ: average of 688.5 keV *5* (1992Bo21) and 688.5 keV (1994Ki01).
^{x}691.4[‡@] *5*	29 *10*								
818.5 *5*	78 *4*	1596.0	(5^-)	777.5	6^+	E1		0.00285	α(K)= 0.00238; α(L)= 0.000351 E_γ: average of 818.5 keV *5* (1992Bo21) and 818.4 keV (1994Ki01). Mult.: from α(K)exp=0.002 *1* (1994Ki01).
819.1	7 *2*	1254.1	4^+	434.9	4^+				
830.9	13 *3*	989.4	4^+	158.51	2^+				
846.4	27 *3*	846.2	2^+	0.0	0^+				
895.6 *4*	25 *3*	1054.0	3^+	158.51	2^+	E2+M1	8 *+5−2*	0.00641	α(K)= 0.00514; α(L)= 0.000954 E_γ: average of 895.9 keV *5* (1992Bo21) and 895.2 keV (1994Ki01). Mult.,δ: from α(K)exp=0.0047 *12*; A_{22}=−0.11 *10*, A_{44}=−0.14 *11* in $\gamma\gamma(\theta)$ (1994Ki01).
989.8	27 *4*	1424.9	6^+	434.9	4^+				
1012.0 *5*	59 *4*	1789.4	(6^-)	777.5	6^+				E_γ: average of 1012.0 keV *5* (1992Bo21) and 1011.9 keV (1994Ki01).
1017.5 *5*	20 *2*	1452.4	5^+	434.9	4^+				E_γ: average of 1017.5 keV *5* (1992Bo21) and 1017.6 keV (1994Ki01).
1082.7	7 *2*	1860.2	(7^-)	777.5	6^+				
1095.6	3.5 *7*	1254.1	4^+	158.51	2^+				
1114.0 *5*	59 *4*	1549.0	(4^-)	434.9	4^+				E_γ: average of 1113.6 keV *5* (1992Bo21) and 1114.3 keV (1994Ki01).
1161.0	2.8 *14*	1596.0	(5^-)	434.9	4^+				
1261.5 *5*	12 *4*	1420.1	(3^-)	158.51	2^+	E1(+M2)	+0.7 *+3−2*	0.0059 *24*	α(K)= 0.005020; α(L)= 0.0007 *3* E_γ: average of 1261.5 keV *5* (1992Bo21) and 1261.7 keV (1994Ki01).

$^{174}_{76}Os_{98}$-3

^{174}Ir ε decay (7.9 s+4.9 s) 1994Ki01,1992Bo21,1992Sc16 (continued)

$\gamma(^{174}Os)$ (continued)

E_γ[†]	I_γ[†]	E_i(level)	Comments
			Mult.,δ: from A_{22}=+0.27 *11*, A_{44}=+0.04 *12* in $\gamma\gamma(\theta)$ (1994Ki01).
[x]1326.7[‡] *5*	38 *10*		

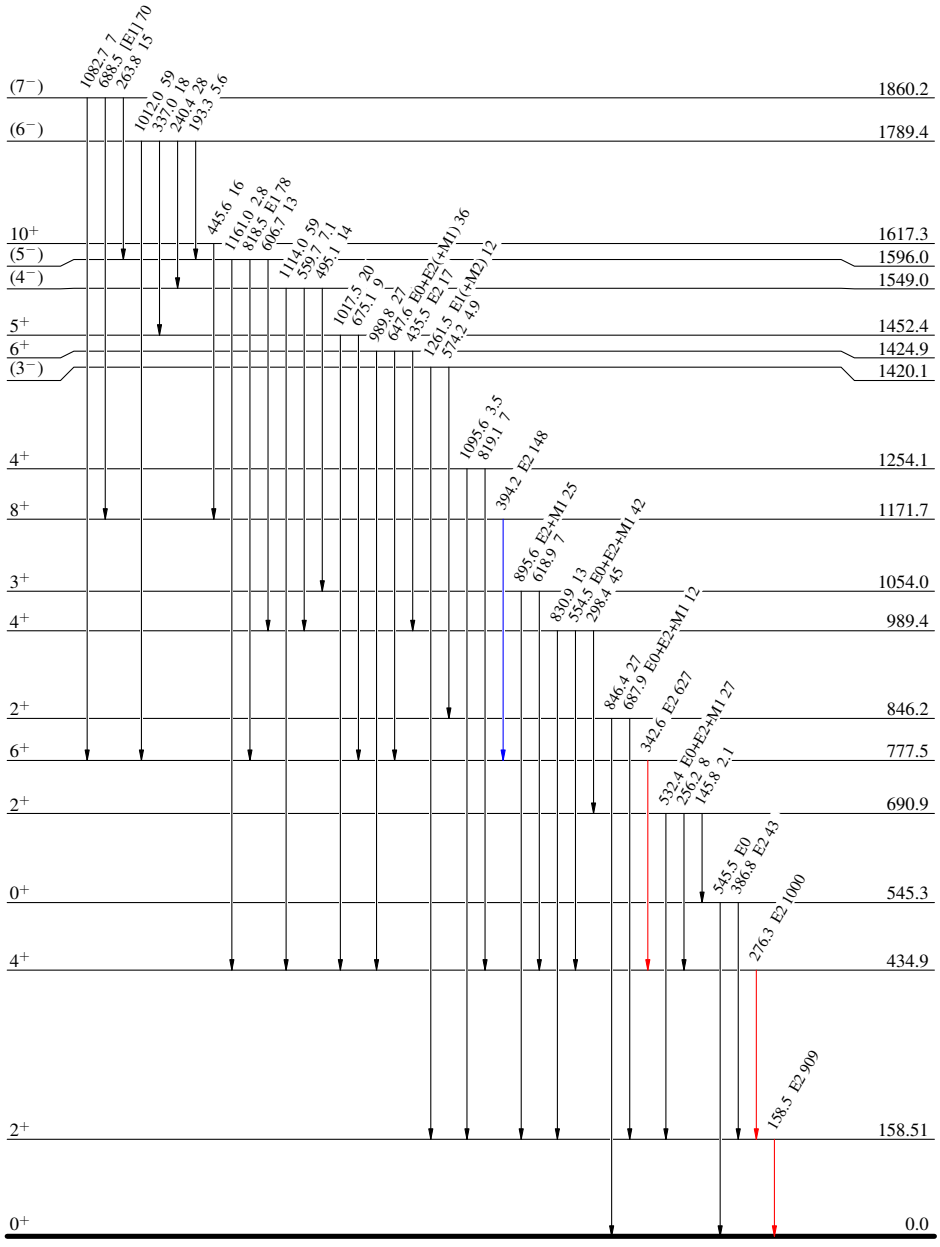
[†] From 1994Ki01, using a source with ^{174}Ir(J^π=(7^+)) and ^{174}Ir(J^π= (3^+)) isomers, unless otherwise specified.
[‡] Observed by 1992Bo21 only.
[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[@] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

$^{174}_{76}Os_{98}$-4

^{174}Ir ε decay (7.9 s+4.9 s) 1994Ki01,1992Bo21,1992Sc16

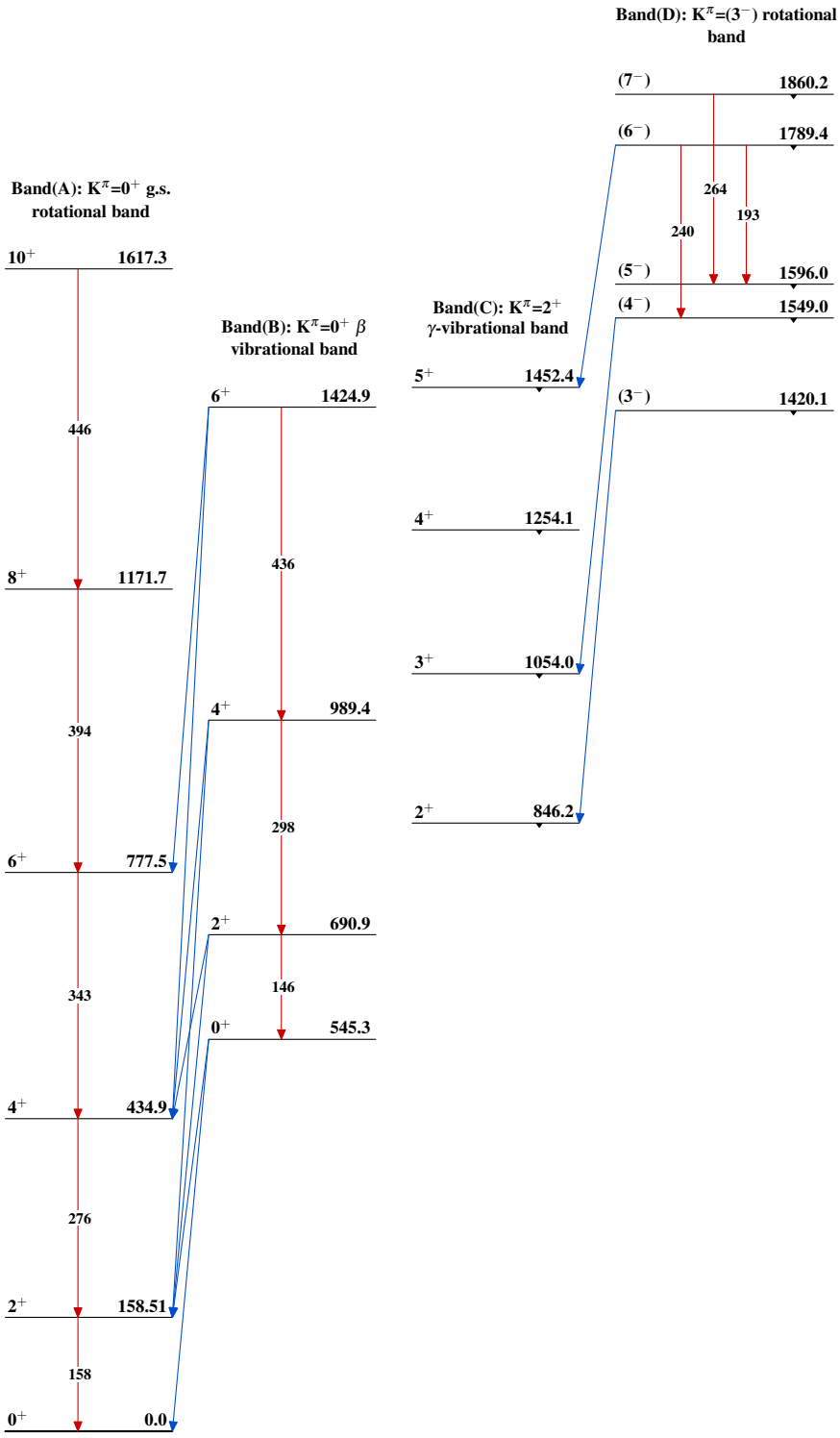
Decay Scheme

Intensities: Legend intensities from a source which contained both ^{174}Ir(J^{π}=(7^+)) and ^{174}Ir(J^{π}=(3^+)) isomers.And ^{174}Ir(J^{π}=(3^+)) isomers.



$^{174}_{76}Os_{98}$

^{174}Ir ε decay (7.9 s+4.9 s) 1994Ki01,1992Bo21,1992Sc16



$^{174}_{76}Os_{98}$