172 Ir α decay (4.4 s) 1992Sc16,2004GoZZ

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Parent: 172 Ir: E=0.0; J^{π} =(3); $T_{1/2}$ =4.4 s 3; $Q(\alpha)$ =5996 7; % α decay \approx 2.0

 172 Ir-%α decay: From 1992Sc16; <0.02 from 2004GoZZ.

2004GoZZ: 172 Ir sources from α -decay of 176 Au produced In 84 Sr bombardment of Mo; fragment mass analyzer and double-sided Si strip detector (for recoils and decay α particles) surrounded by 4 Ge detectors and a low-energy photon spectrometer; recoil decay tagging technique; measured $E\alpha$, $I\alpha$, recoil- α - γ coin, α (t), parent-daughter α correlations.

1992Sc16: sources from 141 Pr(36 Ar,5n), E(36 Ar)=234 MeV primary beam, helium-jet transport; monoisotopic targets; measured excitation functions (175 MeV to 204 MeV At target face), E α , E γ , I α , I γ , $\alpha\gamma$ coin, (α)(K x ray) coin.

168Re Levels

E(level) [†]	$J^{\pi \ddagger}$	Comments							
0.0	$\overline{(7^+)}$								
89.7 [@] 4									
226.0 [@] 6		J^{π} : (2,3,4) if 123 γ is correctly placed. 2004GoZZ suggest a K^{π} =2+ configuration of (π 9/2[514])-(ν							
		$5/2[523]$); however, higher than E2 multipolarity would then Be required for one of the 2 cascade gammas to a (7^+) g.s., inconsistent with measured I(K x ray).							
349.2 [#] 6	(3)								

[†] From Eγ.

α radiations

Εα	E(level)	$I\alpha^{\ddagger}$	HF [†]	Comments					
5515 7	349.2	349.2 100 ≈2.9		ε ε		Eα: weighted average of 5510 $I0$ (1992sc16) and 5520 $I0$ (2004GoZZ). this Eα implies $O(\alpha) = 5996$ 7 (cf. 5850 $I10$ (SYST.; 2003Au03, 2009AuZZ).	` ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '		
				correlated with 6282α from 176 Au(low J) (2004GoZZ).					

[†] If r_0 =1.5580 *12*, unweighted average of $r_0(^{166}W)$ =1.560 6 (2008Ba14), $r_0(^{168}W)$ =1.56 2 and $r_0(^{168}Os)$ =1.557 4 (this evaluation), and $r_0(^{170}Os)$ =1.555 3 (2002Ba93) (weighted average is 1.5564 22). The measured $E\alpha$ =5515 7 to 349 level has been used for the calculation of HF; that $E\alpha$ implies $Q(\alpha)$ =5996 7 cf. 5850 *110* (SYST.; 2003Au03, 2009AuZZ).

$\gamma(^{168}\text{Re})$

Other Ey: 136.3 5 from 2004GoZZ (table 5.1); however, origin of this Ey is unclear since authors state that they do not observe the 136y reported by 1992Sc16 for low-J 172 Ir decay and (apparently erroneously) associate a 136y with high-J 172 Ir decay In table 5.1. No 136y appears In α - γ coin spectra In fig. 6.12 or the decay schemes of fig. 6.4 where both high- and low-spin 172 Ir α decay data are presented by 2004GoZZ.

[‡] From Adopted Levels.

^{# 1992}Sc16 report three γ rays in coincidence with each other and with their 5510-keV α group; observed I(Re K x ray)=24 4 (on same intensity scale As I γ) implies low multipolarities for all 3 γ -rays. 1992Sc16 deduce E(level)=349 by summing the cascade γ energies. 2004GoZZ observe a 123 γ In coincidence with their 5520 α , but find No evidence for the 90 γ and 136 γ reported by 1992Sc16; possibly, this can Be attributed to statistically inadequate data.

[@] E May differ from value shown because order of 90γ - 123γ - 136γ cascade has not been established.

[‡] For absolute intensity per 100 decays, multiply by ≈ 0.020 .

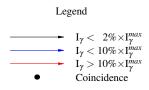
172 Ir α decay (4.4 s) 1992Sc16,2004GoZZ (continued)

$\gamma(^{168}\text{Re})$ (continued)

E_{γ}^{\dagger}	I_{γ}^{\dagger}	E_i (level)	\mathbf{J}_i^{π}	\mathbf{E}_f \mathbf{J}_f^{π}	Mult.	α^{\ddagger}	Comments
89.7 4	10 3	89.7		0.0 (7 ⁺)			Mult.: E1 or E2(+M1) but not pure M1 based on observed I(Re K x ray) from 1992Sc16; if E2, Ti(90) is comparable to Ti(123).
123.2 <i>2</i>	54 <i>7</i>	349.2 226.0	(3)	226.0 89.7	(E1)	0.224	$\alpha(K)=0.183$ 3; $\alpha(L)=0.0314$ 5; $\alpha(M)=0.00718$ 11; $\alpha(N+)=0.00200$ 3 $\alpha(N)=0.00171$ 3; $\alpha(O)=0.000271$ 4; $\alpha(P)=1.444\times10^{-5}$ 21 other Ey: 122.7 5 from 2004GoZZ. Mult.: I(Re K x ray)=24 4 rules out M1 and favors E1 (1992Sc16); also, E1 is consistent with 2004GoZZ's non-observance of ce associated x-rays for this transition. note that the order of the 90y-123y-136y cascade has not been determined, so it is equally likely that the 90y or the 136y deexcites this level instead of the 123y. Mult.: probably E1 or E2 based on observed I(Re K x ray)
130.3 4	10 3	220.0		09.1			from 1992Sc16. However, In either case, $Ti(136\gamma)$ will Be significantly lower than $Ti(123\gamma)$.

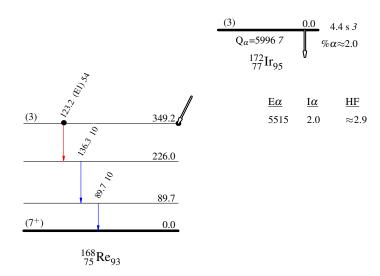
[†] From 1992Sc16.

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Decay Scheme

Intensities: Per 100 α decays



 $^{^{\}ddagger}$ 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.