^{176}Au α decay (1.36 s) 2014An10

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	31-Dec-2015

Parent: ^{176}Au: E=0+y; J^π=(8^+,9^+); $T_{1/2}$=1.36 s *2*; Q(α)=6433 *7*; %α decay=100.0

^{176}Au-E: Absolute energies of the g.s. and isomer in ^{176}Au are not known according to 2014An10.

^{176}Au-J^π: (8^+,9^+) suggested in 2014An10 from possible configuration= $\pi 11/2^-$,($h_{11/2}$ orbital)⊗$\nu 7/2^-$,($f_{7/2}$ or $h_{9/2}$ orbital); (9^+) suggested by 2004GoZZ, but it is less likely if 0+y level is 7^+ and 175.2 and 211.6 gammas are of M1 multipolarity.

^{176}Au-$T_{1/2}$: From 2004GoZZ.

^{176}Au-Q(α): From Eα=6287 keV *7* (2014An10). Other: 6558 keV *7* (2012Wa38).

^{176}Au-%α decay: %α≈100 assumed (2014An10).

2014An10: ^{176}Au produced in ^{141}Pr(^{40}Ca,5n),E(^{40}Ca)=208, 212 MeV reaction using UNILAC accelerator and SHIP separator at GSI. Measured Eα, Iα, Eγ, Iγ, (implants)α correlations, αγ and αα correlations using 300 μm thick 35x80 mm^2 16-sided position- sensitive 16-sided Si detector, and three tof detectors to distinguish between reaction products and scattered beam particles. Gamma rays were detected using a 4-crystal Clover Ge detector with a lower detection threshold of ≈20 keV photon energy.

^{172}Ir Levels

A 168.4, (5^-) level reported in 1984ScZQ and 1975Ca06 is not confirmed by 2014An10.

E(level)†	J^π	Comments
0+y	(7^+)	J^π: from 2014An10 with possible configuration= $\pi 11/2^-$,($h_{11/2}$ orbital)⊗$\nu 3/2^-$,($f_{7/2}$ or $h_{9/2}$ orbital).
175.2+y *3*	(8^+,9^+)	J^π: 2014An10 assign (8^+,9^+) based on favored α decay from (8^+,9^+) parent state. But (9^+) is not likely if 175.2γ to (7^+) is (M1). Possible configuration=$\pi 11/2^-$,($h_{11/2}$ orbital)⊗$\nu 7/2^-$,($f_{7/2}$ or $h_{9/2}$ orbital).
211.6+y *3*	(8^+,9^+)	J^π: 2014An10 assign (8^+,9^+) based on favored α decay from (8^+,9^+) parent state. But (9^+) is not likely if 211.6γ to (7^+) is (M1). Possible configuration=$\pi 11/2^-$,($h_{11/2}$ orbital)⊗$\nu 7/2^-$,($f_{7/2}$ or $h_{9/2}$ orbital).

† From Eγ data in 2014An10, absolute energies of the g.s. and isomer in ^{172}Ir are not known according to 2014An10.

α radiations

A 6228 *10* α group reported by 1984ScZQ and assigned to α decay of ^{176}Au to a 168.4,(5^-) level in ^{172}Ir has been interpreted by 2014An10 (also in 2004GoZZ) as due to 6117α+ce sum line seen at 6222 keV by 2014An10 in the decay of 1.36-s ^{176}Au decay. A 6260 *10* α group reported by 1975Ca06 has not been confirmed in other α-decay studies.

Eα†	E(level)	Iα†#	HF‡	Comments
6082 *7*	211.6+y	26 *5*	2.3 *5*	Reduced α width δ^2_α=43 keV *9* (2014An10).
6117 *7*	175.2+y	66 *5*	1.27 *11*	Reduced α width δ^2_α=79 keV *8* (2014An10).
6287 *7*	0+y	8 *1*	50 *7*	Reduced α width δ^2_α=2.0 keV *3* (2014An10).

† From 2014An10.

‡ Deduced by evaluator using ALPHAD code with r_0=1.5517 *160* (deduced from interpolation of neighboring even-even nuclei), and assuming y=0 for parent and daughter nuclei. 2014An10 give values normalized to 1 for α to 175.2+y level.

Absolute intensity per 100 decays.

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$\gamma(^{172}Ir)$

A 168.4γ with proposed M2 multipolarity in 1984ScZQ is not confirmed by 2014An10.

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[‡]
175.2 *3*	175.2+y	$(8^+,9^+)$	0+y	(7^+)	(M1)	1.243
211.6 *3*	211.6+y	$(8^+,9^+)$	0+y	(7^+)	(M1)	0.734

[†] From considerations of observed intensities of K-x rays of Ir as compared to the photon intensities of 175.2γ and 211.6γ from the decay of high-spin isomer of ^{176}Au, and 126.3γ and 151.5γ from the decay of low-spin isomer of ^{176}Au.

[‡] 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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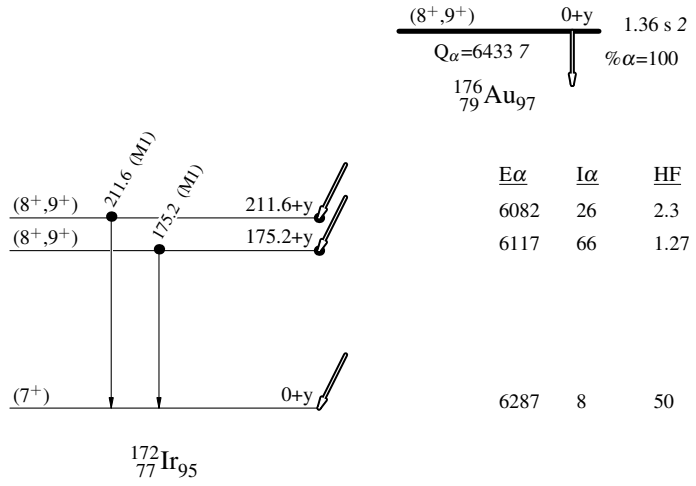
Decay Scheme

Legend

● Coincidence



Eα	Iα	HF
6082	26	2.3
6117	66	1.27
6287	8	50