^{178}Pt α decay 1998Ak04

History

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

Parent: ^{178}Pt: E=0.0; $J^\pi=0^+$; $T_{1/2}$=21.1 s *6*; Q(α)=5573 *3*; %α decay=4.6 *31*

The measured half-lives are 22 s *2* (1993Me13), 21 s *1* (1982Bo04), 19 s *2* (1970Ha18), 21.2 s *8* (1968De01) and 21.3 s *15* (1966Si08). $T_{1/2}$(^{178}Pt)=21.1 s *6*, the weighted average of the measured values is adopted in 1994Br18, and used here.

The intensities of Iα(5446α)=1.3% and Iα(5284α)=0.07% were obtained by 1966Si08 from the relative α intensities and the relative (^{16}O,xn) production cross-sections of platinum isotopes for ^{168}Yb-^{174}Yb enriched targets. It was assumed that the ratios of maximum cross sections for x=6,7, and 8 are the same for all ytterbium targets.

The α intensities of Iα(5446α)=7.2% 8 and Iα(5284α)=0.20% 7, reported by 1970Ha18, give α-decay branching=7.4% 9. The isotope was produced in the ^{182}Hg α decay, and α branching was obtained by comparing parent and daughter α activities. The 5284-keV α peak was obscured in the singles spectrum by ^{210}Po contamination; its assignment was based on α-γ coincidences. The reported Iα(5446α)/Iα(5284α) ratio was obtained by assuming 10% of the 5284-keV α peak was from ^{182}Au, produced in the β decay of ^{182}Hg.

The α branching was reported by 1980Sc09 as 7.5% 3, presumably for the main α group. In this case, the 5284α intensity should be added. The isotope ^{178}Pt was produced by 1980Sc09 in ^{186}Pb α decay. The α branching of ^{178}Pt was determined from comparison of intensities of parent and daughter activities in the same spectrum. The considered activities of ^{178}Ir and ^{174}Os (β and α daughters of ^{178}Pt) and their intensities are not given in 1980Sc09.

%α=7.7 *3* is adopted in 1994Br18 from Iα(5440α)=7.5% 3 (1980Sc09) and Iα(5284α)/Iα(5440α)=0.028 *10* (1970Ha18). Adoption of the ratio Iα(5284α)/Iα(5440α)=0.07/1.3=0.054 (1966Si08) would give %α=7.9 *4*.

The calculated radius parameters are r_0=1.570 *3* and r_0=1.484, for %α=7.7 *3* and %α=1.4, respectively. The r_0 systematics suggests r_0=1.540 from which the partial α half-life of the 5446α is calculated as 4.6×10^2 s, yielding an absolute value of Iα(5446α)=4.6% and therefore, the α branching of %α=4.8.

Based on the uncertainties of the experimental branchings due to the assumptions had been made and based on the r_0 systematics, %α=4.6 *31*, an average value with a large uncertainty in order to cover all values is suggested here.

Q(α)(^{178}Pt)=5573.4 *26* is from 1995Au04. Eα=5446 *3* gives Q(α)=5571 *3*.

^{174}Os Levels

E(level)	J^π
0.0	0^+
158.7 *3*	2^+

α radiations

Eα	E(level)	Iα[†#]	HF[‡]	Comments
5291 *4*	158.7	5.1 *24*	3.3 *16*	Eα: calculated from E(level)=158.7 *3* and Eα(g.s.)=5446 *3*.
5446 *3*	0.0	94.9 *24*	1.0	Eα: the measured α energies (adjusted, as recommended by 1991Ry01, for the changes in the calibration energies) are 5440 *10* (1966Si08), 5443 *10* (1978Fa16), 5458 *5* (1979Ha10), 5445 *3* (1982Bo04). Eα=5446 *3* is recommended by 1991Ry01.

† α intensity per 100 α decays. Relative α intensities of Iα(to 2^+)/Iα(to 0^+)=7/130=0.054, measured by 1966Si08, is recommended here, since the α peaks in the spectrum of 1966Si08 were not obscured. Iα(to 2^+)/Iα(to 0^+)=0.028 *10* was measured by 1970Ha18. This ratio gives Iα(5446α)=97.3, Iα(5284α)=2.7 per 100 α decays. Uncertainties on Iα (no ΔIα's are reported in 1966Si08) are assigned here such that Iα's of 1970Ha18 will be covered.

‡ r_0(^{174}Os)=1.54 *3* is calculated by requiring Hf(5446α)=1.0.

For absolute intensity per 100 decays, multiply by 0.046 *31*.