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CARRIER-FREE RADIOISOTOPES FROM CYCLOTRON TARGETS.

XXIV. PREPARATION AND ISOLATION OF Ir^{188,190,192} FROM OSMIUM*

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September 26, 1951

Bombardment of osmium with 19 Mev deuterons produces, by (d,2n) and (d,n) reactions, several relatively long-lived, known, radioactive isotopes of iridium⁽¹⁾⁽²⁾; viz., Ir¹⁸⁷, Ir¹⁸⁸, two isomers of Ir¹⁹⁰, and Ir¹⁹². Radioisotopes of rhenium and osmium are also produced concurrently in relatively low yield by (n,p) and (d,p) reactions. This paper reports a method for isolation of iridium activities from irradiated osmium without the addition of stable iridium carrier.

The target was osmium metal powder (ca 0.5 g) in which no iridium (less than 0.01%) was detected by spectrographic analysis. The osmium powder was held on a grooved, water-cooled target plate by a 0.25 mil platinum foil during bombardment in the 60-inch Crocker Laboratory cyclotron.

After bombardment the osmium powder was dissolved, with heating, in a minimal amount of aqua regia. Excess nitric acid was added and the solution was heated to dryness to distill off the osmium tetroxide. Two milliliters of nitric acid was added and heated to dryness. Two milliliters of sulfuric acid was added and heated to fuming. Into the fuming sulfuric acid, 1 ml

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(1) Nuclear data, National Bureau of Standards Circular 499, (September 1950)

(2) T. C. Chu, Phys. Rev. 79 582 (1950)

of HBr was added dropwise to remove radioactive rhenium. The sulfuric acid was heated to dryness. The remaining activity was taken up in 5 ml HCl and transferred to a 10 ml beaker. Twenty-five milligrams of NaCl was added and the solution was heated to dryness. The NaCl was dissolved in water to give a solution of isotonic saline suitable for biological use.

The decay periods of the isolated activity agreed with published data (1)(2). Decay half-lives of approximately 40 hours, 12.5 days and 72 days could be resolved. No attempt was made to detect shorter periods. Identification was further verified by a chemical separation of iridium from an aliquot of the preparation using milligram amounts of rhenium, osmium, and iridium as carriers.

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