UCRL-1486
Unclassified-Chemistry Distribution

UNIVERSITY OF CALIFORNIA

Radiation Laboratory

Contract No. W-7405-eng-48

UNCLASSIFIED

CARRIER FREE RADIOISOTOPES FROM CYCLOTRON TARGETS. XXIV. PREPARATION AND ISOLATION OF $Ir^{188,190,192}$ FROM OSMIUM

Herman R. Haymond, Warren M. Garrison and Joseph G. Hamilton

September 26, 1951

Berkeley, California

DISCLAIMER

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor the Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or the Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof or the Regents of the University of California.

CARRIER-FREE RADIOISOTOPES FROM CYCLOTRON TARGETS.

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

Herman R. Haymond, Warren M. Garrison and Joseph G. Hamilton

Crocker Laboratory, Radiation Laboratory, Divisions of Medical Physics, Experimental Medicine and Radiology; University of California, Berkeley and San Francisco

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., Ir^{187}, Ir^{188}, two isomers of Ir^{190}, and Ir^{192}. 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 tetraoxide. 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

---

*This document is based on work performed under Contract W-7405-eng-48A for the Atomic Energy Commission.

(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.

We wish to thank Professor G. T. Seaborg for reviewing the manuscript, Dr. T. Putnam, Mr. G. B. Rossi and the crew of the 60-inch cyclotron for their help with the bombardments, and Miss Margaret Gee for technical assistance.