

GROUP CMR-4 MONTHLY REPORT -- E. S. Robinson, Acting Group Leader -- July 25, 1949

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PROJECT & PERSONNEL

PROGRESS

CMR-4-4
Preparation of Tritium and Deuterium Foils.

Goldblatt

Some clean tungsten targets have been prepared for use in thin zirconium film experiments. Preliminary experiments with the distillation of zirconium onto W targets has shown the need for modification of the apparatus.

CMR-4-8
Preparation of Foils of Active Material.

Evans, Povelites

Data on foils prepared since June 21, 1949:

Foil No.	Material	Am't (as metal)
7L48 A1-8-11	49	~35,000 c/m each
8P-36-1	49	46 µg.
BF 401 D-9	25	1.42 mg.
EQ-1-C	28	187.5 mg.
Th-17	Th	1.13 mg.
Th-18	Th	1.22 mg.

A solution containing 500 mg. U-235 (as nitrate) in 25 ml. alcohol was prepared for Froman.

CMR-4-13
Americium Production Design.

Hoover, Penneman

The large-scale americium separation unit is complete and preparations are being made for the americium separation from 235 g. of plutonium.

CMR-4-14
Plutonium Chemistry Involved in Transplutonic Production.

Lane, Nigon, Penneman

Ten milligrams of americium has been sent to Chalk River for production of curium. Americium hydroxide was precipitated in a platinum centrifuge cone, ignited to the oxide, and the sealed cone was placed in a platinum case which was welded shut with platinum.

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M. J. J. 5/17/49

The solubility of neodymium hydroxide in potassium carbonate is being determined. At a concentration of 10 g. Nd/liter, a ratio of CO₃/Nd of approximately 33 is needed. Neodymium hydroxide is quantitatively precipitated from such carbonate solution by potassium hydroxide.

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In cooperation with E. Staritzky the crystal properties of some americium compounds are being investigated. Americium oxalate has been shown to be isomorphous with Pu(III), Ce(III) and Nd(III)

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CMR-4-14 (Cont'd)

oxalates. Crystal angles and indices are being measured.

The plutonium solution which is being milked of americium was assayed by the cupferron method and indicated 180 mgs. of Am/kg of Pu.

Tracer studies using americium tracer and the anion exchange resin, Dowex-A-1, show no negative complexes in 0.5 N chloride, with some adsorption from citrate, tartrate and cyanide solutions. Using carbonate as the complexing agent, about 95% of the americium was adsorbed with a K_d of ca. 500.

CMR-4-15
Preparation of BF₃ Counters (Filling).

Three counters were filled to 402 mm. Hg. with BF₃ (82% B¹⁰).

Evans, Povelites

CMR-4-24
Geiger Counting of Tritium.

The drafting room is continuing on shop drawings for a thermal diffusion column.

Jones

The utilization of x-rays for the detection of tritium gas contained in a small sampling cell has been continued. Such a cell, provided with a mica window and filled to about 6 cm. Hg pressure with H₂ gas containing 1% tritium, was found to give 80 counts per second when set on an end-window Geiger counter. The counting rate depends on sample pressure in the manner reported last month for richer samples. It was hoped that higher counting rates, allowing extension of the method to weaker samples, could be obtained by increasing the x-ray yield with a thin film of gold evaporated onto the inner surface of the mica cell window. A film of thickness equal to the range of average energy tritium betas was found to increase the counting rate by only 12%, however

Some calculations have been made regarding expected relative rates of photochemical reaction of H₂ and HT in their photochemical reaction

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CMR-4-24 (Cont'd)

with Cl₂. Apparatus is being drawn up for the experiment. It is planned to follow the removal of HT by the counting of x-rays as above. Suggestions by Rollefson have been very helpful.

Goldblatt

Construction has started on a vacuum system which will be used to transport tritium in the analysis of tritium-hydrogen mixtures by the ion chamber method.

CMR-4-28
Separation of Tritium and Hydrogen.

// The Hertz pump line has been run under varying conditions of running time, pressure, and take-off volume in order to determine the operating conditions for the maximum production of D₂. It is assumed somewhat similar conditions will apply to tritium-hydrogen separation.

Dunn, Mosley, Potter,
Robinson

The filling, collecting, analyzing, and storing sections of the line are being rebuilt to substitute mercury cut-offs for stopcocks before the separation of tritium is begun. This procedure will eliminate any chance of tritium loss through exchange or reaction with the stopcock grease.

The new thermal conductivity analysis apparatus has been received from Leeds and Northrup. Its testing awaits rebuilding of the line.

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