

GE - AEC BUSINESS RECORD
RETURN TO:

CENTRAL FILES, 717 BLDG., 700 AREA



GENERAL ELECTRIC

HANFORD ATOMIC PRODUCTS OPERATION

DECLASSIFIED
RECEIVED
RECORD CENTER FILE

DOCUMENT NO.

HW-40996

DATE

1-19-56

COPY NO. AND SERIES

FILE DESIGNATION

GE - AEC BUSINESS RECORD
RETURN TO:

CENTRAL FILES, 717 BLDG., 700 AREA

TITLE

REPORT OF INVENTION
Use of Fluosilicate for the Precipitation of Plutonium Fluoride

AUTHOR

Ray L. Beede
Horace H. Hopkins, Jr.

THIS DOCUMENT CONTAINS RESTRICTED DATA DEFINED AS SUCH BY EXECUTIVE ORDER 11652 OF ITS TITLE OR THE ACT OF CONGRESS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED.

OTHER OFFICIAL CLASSIFIED INFORMATION
THIS MATERIAL CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U. S. C., SECS. 793 AND 794, THE TRANSMISSION OR REVELATION OF WHICH IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

GE-AEC BUSINESS RECORD

THIS DOCUMENT MUST NOT BE LEFT UNATTENDED OR WHERE AN UNAUTHORIZED PERSON MAY HAVE ACCESS TO IT. WHEN NOT IN USE IT MUST BE KEPT IN AN APPROVED LOCKED REPOSITORY OR IN AN APPROVED GUARDED AREA. IT IS YOUR RESPONSIBILITY TO OBTAIN RECEIPTS FROM THE PERSONS TO WHOM YOU LOAN IT AND ITS CONTENTS WITHIN THE TIME FRAME OF THIS PROGRAM AND FROM ANY UNAUTHORIZED PERSONS TRANSMITTING OR STORAGE AT ANY PLACE OF STORAGE IS PROHIBITED. IT IS NOT TO BE REPRODUCED, COPIED, OR DISTRIBUTED. IF COPIES ARE REQUIRED, THEY MUST BE OBTAINED FROM THE ISSUING OFFICE. ALL PERSONS READING THIS DOCUMENT MUST SIGN IN THE SPACE PROVIDED BELOW.

ROUTE TO:

PAYROLL NO.

LOCATION

SIGNATURE

DATE

GENERAL ELECTRIC

RECORD

APPROVED FOR
PUBLIC RELEASE

R.M. ITAN
10-9-98

GE

DECLASSIFIED

1st REVIEW-DATE: 6/28/82
AUTHORITY: AOC (ADC) ADM
NAME: A.E. Barber
ORG: PNL
2nd REVIEW-DATE: 6/28/82
NAME: J.P. DEROUIN
ORG: PNL

AP-209-12-20-92

AP-209-18-99

Indefinite Retention

Authority

Doc May 1973

BEST AVAILABLE COPY

DECLASSIFICATION CANCELLED

C-3195-MB

DECLASSIFIED

(CLASSIFICATION)

Per Doc
By [Signature] 1-17-73

ATOMIC PRODUCTS DIVISION
GENERAL ELECTRIC COMPANY
 RICHLAND, WASHINGTON

DECLASSIFIED

REPORT OF INVENTION

A.E.C. CASE NO.

G. E. CASE NO.

HWIR-672

TO:

H. C. Pae
~~M. K. Cain~~

I: ATTACHED HERETO IS A DESCRIPTION OF WHAT MAY BE AN INVENTION IN:

Use of fluosilicate in homogeneous precipitation for the preparation of crystalline plutonium fluorides.

II: THE NAME, TITLE OR POSITION, WORKS LOCATION, AND PERMANENT ADDRESS OF THE INVENTOR(S) IS:

1. Ray L. Beede, Engineer, 234-5 Development, Engineering Dept. 234-5 Bldg. 200-W
2. Horace H. Hopkins, Jr., Head - 234-5 Development, Engineering Dept. 234-5 Bldg., 200 West

III: EVIDENCE AS TO WHEN AND WHERE THE INVENTION WAS MADE CAN BE FOUND IN THE FOLLOWING LISTED WRITTEN OR PICTORIAL MATERIAL (NOTEBOOK, FILE REPORTS OR DRAWINGS, ETC.):

1. HW-39751 H "Sep. Tech. Monthly Report October 1955" (Sec.) p Fc-17.
2. HWN-930 personal notebook (Secret) of Ray L. Beede. p 82.
3. HW-5452-T personal notebook (Secret) of Horace H. Hopkins, Jr. p 141.

IV: THE APPROXIMATE DATE OF THE FIRST ENTRY IN SAID WRITTEN OR PICTORIAL MATERIAL DESCRIBING OR SHOWING SAID INVENTION IS:

October 28, 1955.

V: PERSONS WHO COULD TESTIFY AS TO WHEN AND WHERE THE INVENTION WAS MADE INCLUDE THE FOLLOWING:

R. C. Smith

W. S. Figg

SIGNED (SUPERVISOR)

R. C. Smith

DATE

1-19-56

DEPARTMENT

ENGINEERING

NOTE: SUGGESTIONS FOR PREPARING THE INVENTION DESCRIPTION ARE CONTAINED ON THE REVERSE SIDE OF THIS REPORT.

DECLASSIFIED

This document contains restricted data as defined by the Energy Act of 1954. Its transmittal or disclosure of its contents in any manner to an unauthorized person is prohibited.

This document consists of 2 pages. No. of copies. Series

January 19, 1956

DISTRIBUTION

W. C. Beede

- 1. - 7. ~~M. K. Cain~~
- 8. O. F. Hill
- 9. R. B. Richards
- 10. R. L. Beede
- 11. H. H. Hopkins, Jr.
- 12. 300 File
- 13. Yellow File

USE OF FLUOSILICATE FOR THE PRECIPITATION OF PLUTONIUM FLUORIDE

Fluosilicate in the form of fluosilicic acid solution or solutions of fluosilicate salts, hydrolyzes in acid solution to an equilibrium mixture containing small concentrations of silicic acid and hydrofluoric acid. This reaction provides a means of slowly generating fluoride ion homogeneously in solution. Plutonium ions, quadrivalent (or trivalent) react with fluoride to form stable, insoluble compounds. This reaction proceeds slowly and homogeneously in a fluosilicate solution with the result that the precipitate grows slowly and is highly crystalline in character.

Such a precipitate is readily filtered and washed, in contrast to the behavior of fluoride prepared by the direct addition of hydrofluoric acid to a plutonium nitrate solution. Thus this invention has direct process significance.

In the event some crystalline fluosilicate is formed, it should be possible to convert this material to a fluoride by the addition of excess hydrofluoric acid.

A typical homogeneous precipitation can be carried out at room temperature with a solution 40 g/l plutonium(IV) nitrate and 1.5 M HNO₃. Fluosilicic acid is added as a 31 per cent solution to provide one mole of fluosilicate per mole plutonium. A crystalline plutonium fluoride precipitate becomes evident after approximately 20 minutes. After one hour, 48 per cent hydrofluoric acid can be added to provide four moles of fluoride per mole plutonium. This addition completes the precipitation and converts the silicic acid to fluosilicic acid. The crystalline precipitate can be filtered immediately.

Read and understood by me, this 17 day of February, 1956

Invented by:

Warren S. Figg

Robert Smith

Ray L. Beede 2-1-56
Ray L. Beede, Engineer Date
234-5 Development
Separations Technology Section
ENGINEERING DEPARTMENT

Horace H. Hopkins, Jr. 2-1-56
Horace H. Hopkins, Jr. Date
Head, 234-5 Development
Separations Technology Section
ENGINEERING DEPARTMENT