



MRWFD Kr Capture Project

July 2022

Changing the World's Energy Future

Mitchell Greenhalgh, Amy K Welty, Meghan S Fujimoto, Troy G Garn,
Praveen Thallapally, Peiyuan Gao, Gihan U. Panapitiya



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**Idaho National Laboratory
Idaho Falls, Idaho 83415**

<http://www.inl.gov>

**Prepared for the
U.S. Department of Energy
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517**

MRFP to Zirconium Waste Process Overview

1. Decladding Hydrochlorination

- Converts zirconium or aluminum cladding to volatile $ZrCl_4$ or Al_2Cl_6 .
- Fluidized bed removes heat of reaction

• Third level

2. Stabilization of Declad Product

- Pyrohydrolysis with steam
- Conversion of $ZrCl_4$ to ZrO_2 or Al_2Cl_6 to Al_2O_3 , which are more stable waste forms

3. Oxidation

- NO_2/O_2 reaction gas mix
- Converts uranium to UOx

4. Elutriation

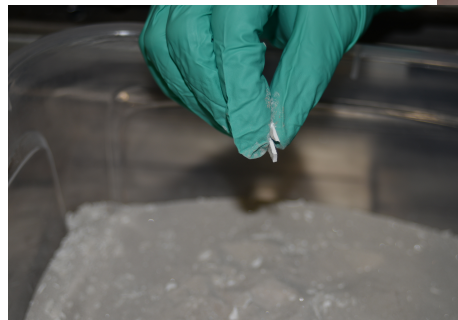
- Fine UOx particles are significantly smaller than alumina bed material
- High velocity nitrogen flow transports UOx to a filter for capture and recovery



Surrogate metal sample



Metal after hydrochlorination



ZrO_2 waste



UOx product sample

MRFP to PLO's Master title

- Near-term credit text
 - ATR fuel bench scale studies
 - Zr-clad fuel pilot studies
 - surrogate fuel product testing
- Long-term:
 - Fifth level
 - ATR fuel pilot studies
 - Develop operational and design recommendations