

# Synthesis of Actinide Molten Salt Fuel

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## Objective

- A supply of actinide salts will be required for many future molten salt research activities in Canada.
- This project seeks to develop an effective process for the synthesis of actinide salts (chlorides and fluorides) from oxides.

## Federal Stakeholders

- Canadian Nuclear Safety Commission

## Previous Work

Two inert atmosphere, negative pressure gloveboxes were purchased and installed for molten salt work.

## Upcoming work

- Commission new test facility

## Results

- Literature review of synthesis methods for actinide chlorides has been completed
- Experimental proposal for synthesis of U, Th and Pu chlorides is complete
- Equipment has been purchased

## Overview of Chloride Experiments

- Conversion of  $\text{UO}_2$  to  $\text{U}_3\text{O}_8$ ,  $\text{ThO}_2$  to Th oxalate and  $\text{PuO}_2$  to Pu oxalate
- Chlorination using hexachloropropene
- Filtration and washing
- $\text{UCl}_4$  reduced to  $\text{UCl}_3$  through reaction with metallic zinc

## Future years

- Conduct experiments to produce salts
- Characterize produced salts