



*Gloveboxes at
the Engineering
Development
Laboratory*

Materials and Fuels Complex Pyrochemistry Research Capabilities

Supporting pyrochemistry and molten salt research

Pyrochemistry—the study of chemical reactions at high temperatures—is important for the development of advanced nuclear technologies. In particular, researchers rely on pyrochemistry for molten salt reactors, a type of reactor where the fuel is dissolved in molten salt; and pyroprocessing, where molten salts are involved in recycling used nuclear fuel to recover valuable elements like uranium and plutonium.

The Pyrochemistry Laboratories located at Idaho National Laboratory's Materials and Fuels Complex (MFC) play a vital role in

researching molten salts for processing used nuclear fuels and developing molten salt reactor systems. The research that takes place in this laboratory supports innovative reactor designs like molten chloride reactors.

These multifaceted research facilities house numerous inert atmosphere gloveboxes (i.e., full of argon gas instead of air), high temperature furnaces, analytical instruments and equipment manufacturing tools. The research supports pyrochemistry and molten salt research as well as experimental equipment fabrication and testing. Research applications include molten salts for nuclear energy applications, such as recycling used nuclear fuels and molten salt reactors.

THREE FACILITIES SUPPORTING PYROCHEMISTRY RESEARCH

The MFC Pyrochemistry Laboratories consist of three different facilities: the Engineering Development Laboratory, the Water Chemistry Laboratory and the Turbine Deck, each with their own unique capabilities.

The Engineering Development Laboratory contains multiple inert atmospheres gloveboxes and high temperature furnaces used for molten salt research and development. A small machine shop located in the center of the building supports testing and modification of research hardware.



A researcher interacts with a robotic arm in the Turbine Deck room.

FOR MORE INFORMATION

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The Water Chemistry Laboratory contains a single-sided inert atmosphere glovebox, fume hood and space for bench top experiments and analysis.

The Turbine Deck is a large room capable of equipment testing. It houses a robotic arm and 3D printer for rapid prototyping of materials and mechanical hardware.



A researcher and technician work together to complete small-scale pyrochemistry experiments in the Engineering Development Lab.

KEY CAPABILITIES

- Four inert atmosphere gloveboxes
 - » Utilizes argon
- Molten salt furnaces inside the gloveboxes
 - » Capable of temperatures up to 1,000° C
- High temperature furnaces
 - » Air and argon
 - » Up to 1,700° C
- Thermal property characterization instruments
 - » Thermal mechanical analyzer
 - » Differential scanning calorimeter
 - » Rheometer
 - » Densitometer
- Welding capabilities
 - » 200A tungsten inert gas (TIG) welder,
 - » 250W dual pulse spot welder
 - » Jeweler/detail TIG welder
- Fabrication equipment
 - » Lathe
 - » Mill
 - » Drill press
 - » 3-D printer
 - » Diamond bladed saws

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