



*The Irradiation-Assisted Stress Corrosion Cracking hot cells are located in FASB's west room.*

## Fuels and Applied Science Building

*Fuel Fabrication, Irradiation, Characterization, Post-irradiation Examination, Process Development*

The Fuels and Applied Science Building (FASB) is a radiological facility that houses small hot cells, gloveboxes, hoods, and a variety of equipment that supports nuclear energy research and development. This facility is a key part of the fuel development mission of the Materials and Fuels Complex at Idaho National Laboratory. FASB's capabilities include research and development related to nuclear fuel fabrication, used fuel treatment options, nuclear waste management, and other scientific activities.

The FASB west room contains inert atmosphere gloveboxes used for development of various nuclear fuels, treating waste from glovebox operations, working with

corrosive materials and testing equipment that will be used in other facilities. A set of small hot cells houses an irradiation-assisted stress corrosion cracking system used for evaluating structural material for nuclear light water reactor life extension.

The east room contains material processing areas, a thermal properties laboratory, a sample preparation area and a characterization area that contains electron and optical microscopes and X-ray diffraction X-ray fluorescence equipment.

### KEY CAPABILITIES:

- Irradiation-assisted stress corrosion cracking hot cells
- Two inert fuel development gloveboxes
- Pyrochemistry glovebox

- 3 radiological hoods and one non-radiological hood
- Thermal properties characterization instruments (laser flash, dilatometer, differential scanning calorimeter)
- Cobalt-60 gamma irradiator
- Lab-scale fabrication equipment (hot isostatic press, arc melting furnace)
- Metal and ceramic powder processing equipment (atomizer, milling, mixing, pressing/sintering)
- Numerous heat treating and sintering furnaces

The Fuels and Applied Science Building (FASB) is a radiological facility that has broad capability in fuel fabrication and characterization in support of nuclear energy research and development.

*In addition to the Gamma Irradiation Test Loop shown here, FASB contains inert atmosphere gloveboxes used for fuel development, treating waste from other glovebox operations, and testing equipment that will be used in other facilities.*



The building houses laboratory scale fuel fabrication capability for both dispersion and foil bearing nuclear fuel plates, a pyrochemistry glovebox housing a laboratory scale electrorefiner and other furnaces to perform separations experiments. It also has a set of hot cells, including one that houses an irradiation assisted stress corrosion cracking system that measures corrosion and crack propagation in nuclear reactor structural materials as part of the light water reactor life extension program.

The building also contains a sample preparation and characterization suite with optical and electron microscopes, thermal properties and other characterization equipment.

**BASIC CAPABILITIES:**

- Uranium fuel development at all enrichments
- Materials characterization
- IASCC testing of irradiated materials
- Multiple uranium gloveboxes to support fuel development

- Cobalt-60 gamma irradiator with a radiolysis/hydrolysis test loop

**KEY INSTRUMENTS:**

- Two inert fuel fabrication gloveboxes
  - » Arc-melting furnace with casting capability
  - » Hydraulic press
  - » Gram-scale atomizer
  - » Hydriding/nitriding apparatus
  - » Inert box welding station
- Inert pyrochemistry glovebox
  - » Molten salt electrorefiner
  - » Oxide reduction furnace
  - » Sodium distillation furnace
  - » Fuel form casting
  - » Multi function furnace
- Three radiological fume hoods
- Irradiation assisted stress corrosion cracking
  - » Decontamination station
  - » In-cell imaging microscope
  - » Pressurized water reactor testing rig
  - » Boiling water reactor testing rig

- Fabrication equipment
  - » Hot isostatic press
  - » Hot rolling mill
  - » Multiple furnaces
- Sample preparation and characterization
  - » High- and low-speed saws
  - » Auto polisher
  - » Three scanning electron microscopes
  - » X-ray diffractometer
  - » X-ray fluorescence
  - » Optical microscopes
  - » Particle-size analysis
  - » Microhardness testing
  - » Density measurement (helium pycnometer)
  - » Differential scanning calorimeter
  - » Dilatometer
  - » Laser-flash thermal diffusivity
  - » Positron-annihilation spectroscopy
  - » Tensile, compression and bend testing
  - » Ultrasonic testing
- Cobalt-60 gamma irradiator
- Solvent test loop

**FOR MORE INFORMATION**

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