



Uranium (U-238)

Half Life: 4.5 billion years

Radiation: Alpha, Beta and Gamma Rays

Shielding: 3.5 cm lead for gamma, 9 mm of plastic will absorb all emissions. Bremsstrahlung may be created and require additional shielding

Dosimetry: Body and ring badges

Detection/Measurement: GM probe (pancake) and wipe tests

General Precautions:

- **Maintain your occupational exposure to radiation As Low As Reasonably Achievable [ALARA]**
- **All persons handling radioactive material must be properly trained by EHS prior to handling and are listed as a rad worker by EHS department**
- **Plan experiments accordingly to minimize external exposure by reducing exposure time, using shielding and increasing your distance from the radiation source**
- **Monitor yourself and the work area during and after each use of radioactive material**
- **Use the smallest amount of radioisotope possible to minimize radiation dose and radioactive waste**
- **Keep an accurate inventory of all radioactive material including records of all receipts, transfers and disposal – contact EHS for any disposal needs including liquid waste**
- **Perform and record lab surveys as needed (monthly and post experiment)**

- Avoid generating mixed waste (combinations of radioactive, biological and chemical waste)

Special Precautions:

- Shielding is typically not required for depleted uranium. Depleted uranium is often used as shielding material for other radionuclides and sources of radiation. Natural uranium sources greater than 5 mCi (7 kg) should be stored in a lead container or contained within lead bricks
- In general, uranium compounds are considered more chemically toxic as a heavy metal than as radiotoxic. Care should be taken to prevent ingestion through good hygiene and use of fume hoods or glove boxes.
- Use tools to indirectly handle unshielded sources and potentially contaminated containers - no direct hand contact
- Ensure that an appropriate, operational survey meter is present in the work area and turned on whenever U-238 is handled to immediately detect contamination
- Shield waste containers as needed to maintain accessible dose rate ALARA

Safe Lab Practices:

- Disposable gloves, lab coats, and safety glasses are the minimum PPE required when handling radioactive material
- Remove and discard potentially contaminated PPE prior to leaving the lab area where radioactive material is used
- Cover all lab bench tops where radioactive material is handled with plastic-backed absorbent paper – change as needed
- Handle radioactive solutions in trays large enough to contain the material in the event of a spill
- Never eat, drink, smoke, handle contact lenses, apply cosmetics, or take medicine in the lab - keep food, drinks, and cosmetics out of the lab entirely
- Never pipette by mouth
- Never store food and beverages in refrigerators/freezers used for storing radioisotopes – ensure that isotopes are secured at all times
- Avoid any skin contact with skin-absorbable solvents containing radioactive materials

- **Fume hoods and biological safety cabinets for use with non-airborne radioactive material must work properly and be inspected annually by the EHS department**
- **Do not take any radioactive material off site or use in any ways not approved by the Radiation Safety Officer**