



STANDARD OPERATING PROCEDURES: SULFUR-35

INTRODUCTION:

Sulfur-35 is a commonly used radionuclide with a half-life of 87.4 days, emitting only beta particles with a maximum energy of 0.167 MeV (Million Electron Volts) and an average energy of 0.049 MeV. The beta particles from S-35 travel a maximum of 24 cm. in air.

The above properties are very similar to those of C-14.

CONCERNS:

- The major concern with using S-35 is that it's presence cannot be monitored during it's use, since most Geiger Counters will not be able to detect S-35. Special precautions are needed to keep the work environment clean.
- The regular use of wipe testing is the only way to insure that your work space is not contaminated.
- Contamination on the skin will not likely cause a significant dose to the dead layer of skin, however, it could lead to the internal absorption of S-35 if there are cuts in the skin.
- The maximum permissible body burden for S-35 set by the NRC for the whole body is 400 microcuries.

SHIELDING:

Glass and plastic are the best shields for beta particles from S-35.

DETECTION:

A tiny drop of contamination from S-35 can be easily detected with a wipe test from a Liquid Scintillation Counter.

EQUIPMENT / SUPPLIES:

The following equipment and supplies must be available before handling S-35:

- Liquid scintillation detector.
- Disposable latex or plastic gloves.
- Full-length lab coat.
- Radioactive waste receptacle
- Pipettes dedicated to the use of S-35.
- Commercial decontaminate, i.e. DuPont's "Count Off".

SAFETY RULES:

If the following safety precautions are used when handling S-35, personnel radiation exposure will be as low as reasonably achievable.

1. Designate a specific area of the lab for S-35 handling.
2. Wear a full-length lab coat.
3. Wear two pairs of disposable gloves to protect your hands from becoming contaminated from spills.
4. Never pipette S-35 by mouth.
5. Only use pipettes which have been dedicated to your specific use of S-35.
6. Pipettes will easily become contaminated and therefore, should not be shared with others.
7. If you have reason to believe that your gloves are contaminated, immediately dispose of them in the radioactive waste container.

POST-USE PROCEDURES:

- Conduct a wipe test on all work benches, floor, equipment, centrifuges, and water baths.
- Count the wipes in a Liquid Scintillation counter:
- If contamination is found:
 - Use a commercial radiation contamination remover (i.e. Count Off) with paper towels to clean up the equipment.
 - Place the towels in the radioactive waste receptacle.

- If contamination cannot be removed, place a "radiation" label on the equipment indicating that it is S-35, maximum cpm found, and the date you measured the level.
- Inform your fellow lab workers if any unremovable contamination is found.
- Send a Radiation Contamination Survey Report to the RSO.
- Call the RSO if you have any questions about where to survey, or how to fill out the form.
- Check the normal trash container to make sure no radioactive waste has been accidentally placed there.
- Store the waste temporarily in marked containers.
- Wash your hands thoroughly.
- Bring the waste to the Radiation Safety Office on Fridays. Call 212-305-0303 or X5-0303 for an appointment.
- S-35 waste will be stored by the RSO until it has decayed sufficiently to be disposed by the RSO.

ANY QUESTIONS ABOUT THESE PROCEDURES?

Call the Radiation Safety Office, 212-305-0303 or X5-0303, or email rsocumc@columbia.edu