RADIOISOTOPE BRIEF

Strontium-90 (Sr-90)

Half-life: 29.1 years
Mode of decay: Beta radiation
Chemical properties: Chemically reactive; can create halide, oxide, and sulfide compounds

What is it used for?

Because Sr-90 generates heat as it decays, it is used as a power source for space vehicles, remote weather stations, and navigational beacons. It also is used in industrial gauges and medically, in a controlled manner, to treat bone tumors.

Where does it come from?

Sr-90 is produced commercially through nuclear fission for use in medicine and industry. It also is found in the environment from nuclear testing that occurred in the 1950s and 1960s and in nuclear reactor waste and can contaminate reactor parts and fluids.

What form is it in?

Sr-90 is a soft metal. It can be present in dust from nuclear fission after detonation of nuclear weapons or a nuclear power plant accident.

What does it look like?

In its pure form, Sr-90 is a soft, shiny silver metal, but it quickly changes to yellow when exposed to air.

Beta particles: electrons ejected from the nucleus of a decaying atom. Although they can be stopped by a thin sheet of aluminum, beta particles can penetrate the dead skin layer, potentially causing burns. They can pose a serious direct or external radiation threat and can be lethal depending on the amount received. They also pose a serious internal radiation threat if beta-emitting atoms are ingested or inhaled.

Gamma radiation: high-energy electromagnetic radiation emitted by certain radionuclides when their nuclei transition from a higher to a lower energy state. These rays have high energy and a short wave length. Gamma rays penetrate tissue farther than do beta or alpha particles, but leave a lower concentration of ions in their path to potentially cause cell damage. Gamma rays are very similar to x-rays.

How can it hurt me?

Sr-90 can be inhaled, but ingestion in food and water is the greatest health concern. Once in the body, Sr-90 acts like calcium and is readily incorporated into bones and teeth, where it can cause cancers of the bone, bone marrow, and soft tissues around the bone.

Sr-90 decays to yttrium 90 (Y-90), which in turn decays by beta radiation so that wherever Sr-90 is present Y-90 is also present. Because of the beta radiation, Y-90 poses a risk of burns to the eyes and on the skin from external exposure.

For more information on Sr-90, see the Public Health Statement by the Agency for Toxic Substances and Disease Registry at http://www.atsdr.cdc.gov/toxprofiles/phs149.html, or visit the Environmental Protection Agency at http://www.epa.gov/radiation/radionuclides/strontium.htm.

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For more information on protecting yourself before or during a radiologic emergency, see CDC's fact sheet titled "Frequently Asked Questions (FAQs) About a Radiation Emergency" at http://www.bt.cdc.gov/radiation/emergencyfaq.asp, and "Sheltering in Place During a Radiation Emergency," at http://www.bt.cdc.gov/radiation/shelter.asp.

The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national, and international organizations.

For more information, visit www.bt.cdc.gov/radiation, or call CDC at 800-CDC-INFO (English and Spanish) or 888-232-6348 (TTY).

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