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For immediate release

Argonne's Chiarizia honored for actinide separation work

ARGONNE, Ill. (Aug. 4, 2006) – A scientist at the U.S. Department of Energy's Argonne National Laboratory has been awarded the Glenn T. Seaborg Actinide Separations Award. Chemist Renato Chiarizia was honored for his innovative research on processes that can be used to recycle and dispose of nuclear waste.

Actinides are a series of radioactive elements that include uranium and plutonium. Separating these elements from fission products and other elements in nuclear fuel has applications such as recycling nuclear fuel. In a nuclear reactor, about 10 percent of the uranium in the fuel is used. The rest, if not recycled, is discharged as waste. Techniques such as those Chiarizia works with can be used to separate the excess usable uranium from the rest of the waste for reprocessing into new fuel.

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University of Chicago for the
U.S. Department of Energy.

Chiarizia – add one

Separating actinide from the waste stream would also make more efficient use of repositories. The long-lived actinides can be isolated from the rest and stored in the repositories, while shorter-lived isotopes can be stored separately, freeing up room in the repositories.

Actinide separation is generally done through a process called solvent extraction. Actinides in a water-based solution interact with molecules called extractants and separate into what is known as an organic phase. Ideally, they then return to another water-based phase, where the actinides can be recovered for reuse.

“My research at Argonne led to the physiochemical interpretation of some aspects of this technique that are still poorly understood — for example, the generally unwanted phenomenon known as ‘third phase formation,’” Chiarizia said, referring to a persistent quirk of the separation process in which the organic phase sometimes splits into two other phases that hinder work.

Chiarizia is the fifth Argonne scientist to receive the award since it was created in 1984. Seaborg, the award’s namesake and first recipient, worked at the University of Chicago Metallurgical Laboratory (Argonne’s direct ancestor) from 1942 to 1946. He was the co-discoverer of nine actinide elements.

The nation's first national laboratory, Argonne National Laboratory conducts basic and applied scientific research across a wide spectrum of disciplines, ranging from high-energy physics to climatology and biotechnology. Since 1990, Argonne has worked with more than 600 companies and numerous federal agencies and other organizations to help advance America's scientific leadership and prepare the nation for the future. Argonne is managed by the University of Chicago for the U.S. Department of Energy's Office of Science.