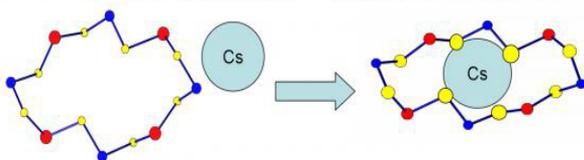
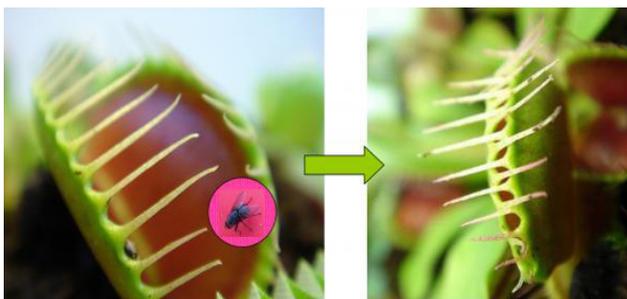


New Material Traps Radioactive Ions Using “Venus Flytrap” Method

One of the main contaminants in the Chernobyl disaster zone is cesium-137, which leaches into soil and water. With a half-life of 30 years, it can remain in the environment, still dangerously radioactive, for decades.

The Challenge

Nuclear waste from power plants contains both non-toxic sodium ions and highly radioactive cesium isotopes. Excising the few deadly isotopes from waste has proved difficult; most remedial materials don't distinguish between the toxic ions and the harmless ones.



Like a Venus flytrap, a newly discovered chemical material is a picky eater—it won't snap its jaws shut for just anything. Instead of flies, however, its favorite food is radioactive nuclear waste.

The Solution

Argonne scientists, in collaboration with Northwestern University, have developed a sulfide framework that can capture radioactive cesium ions, with an effect similar to that of a Venus flytrap.

The new material, a rigid frame composed of metal sulfides, has a negative charge. Its pores, therefore, attract positively charged ions. This makes it a good candidate for ion exchange. Scientists found that cesium ions bond to the sulfide walls in the interior of the structure. This reaction causes the framework to close only on cesium ions, and prevent them from getting out.

The Results

This mechanism has the potential to help speed clean-up at power plants and contaminated sites. The unique process works over a large range of acidities—an essential property for cleanup at different sites around the world, where pH can range considerably.

“The name of the game in cleaning up nuclear waste is to concentrate the dangerous isotopes as efficiently as possible,” said Mercuri Kanatzidis, senior chemist, Argonne National Laboratory. *“That’s where this new material does its job.”*