

UOP, A Honeywell Company

CSTs Clean Radioactive Waste in Fukushima and Worldwide

Radiation waste cleanup was in the public eye this year following the huge earthquake and tsunami in Fukushima, Japan. Sandia National Laboratories (SNL) has a history of helping to solve challenging problems related to radioactive waste cleanup as part of the long-term effort to remediate radwaste at both government sites and nuclear power plants. One of SNL's inventions to meet this challenge is crystalline silico-titanates (CSTs).

UOP, a Honeywell Company, first licensed CST technology from SNL in 1994, shortly after the material was invented. CSTs are inorganic ion exchangers used to separate highly radioactive elements such as cesium from radwaste solutions. By removing the high level elements like cesium using CSTs, the remaining lower level radioactive waste can be treated in a way which will be less costly and hazardous for workers and the environment.

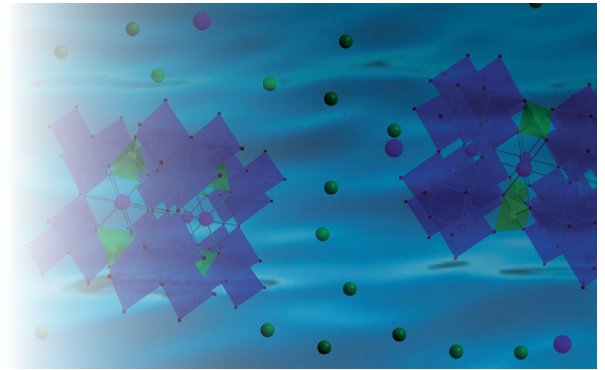
A leader in ion-exchange, adsorbent, and catalyst technologies, UOP immediately saw the value of CSTs for dealing with aqueous wastes at government facilities involved in the production of material for nuclear weapons, as well as at commercial nuclear power plants.

A need for materials which could selectively remove contaminants from aqueous solutions, such as those found in tanks at the government's Hanford Site in Washington state, led SNL chemist Bob Dosch and Texas A&M chemical engineering professor Ray Anthony to recognize that a certain class of synthetic zeolites was far more effective in capturing certain radioactive elements, like cesium, than other available technologies. They invented CSTs, molecularly engineered ion exchangers which could be sized specifically for cesium or other elements.

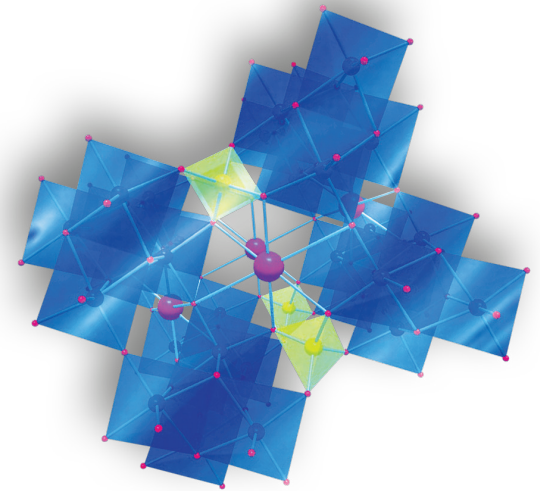
A Cooperative Research and Development Agreement (CRADA) with SNL allowed for commercial development of the CST technology by UOP. In 1996, work on CSTs by UOP, SNL, and Texas A&M led to an R&D 100 award for development of the commercially ready product. UOP continues to market the CSTs as part of its IONSIV Ion Exchanger product line.

In 2011, UOP renegotiated an exclusive license for the patented CST technology, and continued working with SNL on additional mutually beneficial opportunities in the use of ion exchange in waste cleanup. SNL has a broad and expanding portfolio of materials which selectively scavenge contaminants such as arsenic, radioiodine, actinides, and strontium.

"Our work with Sandia National Laboratories allowed UOP to advance this important technology and develop a commercial solution that addresses the needs of global customers," said Robert Gray, business director for Separations, Adsorbents & Specialties for Honeywell's UOP. "Today, the UOP IONSIV products are successfully being used for cleanup of radiation-contaminated water at the Fukushima Daiichi nuclear power plant in Japan, and we are committed to bringing the benefits of this solution to a range of waste remediation applications going forward."



The blue structure is a stylized CST. The magenta spheres are radiocesium ions in water and are being preferentially taken up by the CSTs over the green sodium ions.



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Business Director

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