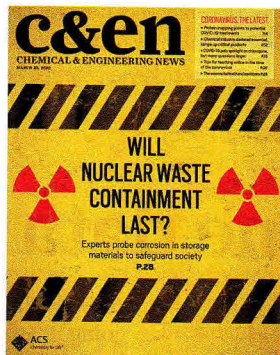


Nuclear waste

A very important cover story in C&EN's March 30 issue has the title "Wanted: Long-Term Storage Solutions for Nuclear Waste" (page 28). A lot of this waste really is in the form of a solution. For example, the Hanford, Washington, site has more than 200 million L of pH 14 waste with radioactive strontium and cesium. Waste has accumulated in the leaking double-wall stainless-steel underground tanks for decades. It was decided to vitrify the waste, which will cost billions of dollars. Before vitrification, huge volumes of solution have to be evaporated, and it should take up to 50 years. The project started 20 years ago, but because of many problems, waste treatment at the Hanford Vit Plant is scheduled to start in 2023. Evaporation was good on a small scale when Marie Curie was working. Nevertheless, she died from exposure to radiation. One does not have to be a Nobel Prize laureate to understand that it is incomparably better and safer to se-



lectively remove small amounts of Sr and Cs (less than 100 kg) from huge volumes of solutions than to do it the other way around.

The method to achieve this exists. Through the facilitated transport through supported liquid membranes, it is possible

to accumulate strontium from diluted alkaline solutions into sulfuric acid up to saturation and formation of a small volume of solid strontium sulfate. Measured with solutions imitating those in Hanford, transport rates are good enough to decrease the time to treat all tanks to 3–4 years, and the cost may be decreased to one-one-hundredth of the current

cost. The method does not need pressure, voltage, high temperature, etc. The simple pH difference between two solutions is a driving factor. Theoretically, in this active transport process it is possible to collect all strontium in the Hanford site tanks and convert it into less than 100 kg of solid material. The same can be done if we treat leaking groundwater and even solutions after the Fukushima, Japan, nuclear disaster.

What can be better? Twenty years ago we patented and then published the results, but all our many attempts to attract the attention of the proper organizations were nothing but fiasco.

Nikolai Kocherginsky
Urbana, Illinois