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Method For Liquid-To-Solid Phase Separation Of Uranium And Uranyl Contaminant From Various Solutions

Tech ID: 32300 / UC Case 2021-727-0

BRIEF DESCRIPTION

Researchers at UCI have developed a separation method for removing radioactive contaminants, specifically uranium contaminants, from liquid solutions.

SUGGESTED USES

- Removal of uranium contaminants from mining waste water and groundwater
- Extraction of uranium deposits from oceans
- Extraction of uranium from fissions products for recycling into new fuel forms

FEATURES/BENEFITS

- Simple collection of uranium/polymer precipitates from liquid solution
- Increased selectivity for uranyl ions ·Decreases production of hazardous waste normally created in standard liquid-liquid extraction methods
- Increased efficiency over liquid-liquid extractions even at low uranium concentrations
- Eliminates fouling and degradation concerns typically seen with membrane separations

TECHNOLOGY DESCRIPTION

Uranium is highly desirable for use in nuclear energy applications. However, the mining, storage, and recycling of uranium from liquid solutions requires special considerations for efficiency and safety. Current separation techniques rely on liquid-liquid extraction (LLE) or membrane filtration. LLE is a multi-step process that generates hazardous by-products and waste with every step and decreases in efficiency for low concentrations. Membrane filtration uses a solid support that is susceptible to fouling and degradation over time.

Researchers at University of California, Irvine developed a separation method for removing uranium contaminants that can be applied to waste water, ocean mining, and fission outlet streams from nuclear reactors. The separation relies on the affinity of polymers for uranyl ions in solution, even at low concentrations, and has increased efficiency over other methods. The complexation creates a solid precipitate that is easily collected and then easily deconstructed with acid. This method is not only relevant for decontaminating waste water, but is also capable of extracting uranium from oceans and recycling uranium from reactor streams, two challenges inherent to nuclear energy.

STATE OF DEVELOPMENT

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

- » **Energy**
- » Other
- » **Materials & Chemicals**
- » Chemicals
- » Polymers

RELATED CASES

2021-727-0

Researchers have demonstrated that the separation is approximately 100% efficient for certain uranium/polymer combinations and are currently optimizing the separation conditions.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20220072509	03/10/2022	2021-727

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Novel Light-Matter Interaction in Semiconductors
- ▶ Method For Rapid In Situ Detection Of Ammonia

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