BIOENGINEERED FRAMEWORKS TO SEPARATE RARE EARTH ELEMENTS

Tech ID: 34265 / UC Case 2026-026-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

UC Berkeley researchers have developed a versatile platform of engineered non-living, semi-living, and living frameworks designed for programmable metal and molecule separation. By integrating metal-binding peptides (MBPs) with stimulus-responsive peptides (SRPs), these systems enable precise, on-demand capture and release of target compounds from complex liquid environments. The technology can be deployed as protein-based hydrogels, bacteriophage nanoparticles, or living bacterial systems, offering unmatched flexibility across industries.

SUGGESTED USES

» Extraction of precious metals (e.g., gold, platinum)

» Recovery of battery-critical elements (lithium, cobalt, nickel)

» Isolation of rare earth elements from ores and electronic waste

» Removal of toxic heavy metals (lead, cadmium, mercury) from wastewater

» Cleanup of contaminated industrial and mining sites

ADVANTAGES

» Trigger binding and release via defined stimuli (e.g., pH, temperature, light), enabling reusable systems

» Adaptable across non-living, semi-living, and living frameworks for different operational needs

» Reduces reliance on expensive, multi-step separation processes like chromatography

» Supports greener recovery of valuable resources and remediation of pollutants

» Performs effectively in challenging environments such as wastewater, ores, and fermentation broths

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OTHER INFORMATION

KEYWORDS

Metal-binding peptide (MBP), stimulus-responsive peptide (SRP), programmable separation, metal recovery, resource extraction, environmental remediation, wastewater treatment, rare earth elements, scalable separation technology

CATEGORIZED AS

» **Biotechnology**

» Other

» **Environment**

» Remediation

» **Materials & Chemicals**

» Composites

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