

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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