Cost-Effective Rare Earth Element Recovery using CO2 Ligand

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Acid mine drainage

Technology Summary

The inventor has developed a process that uses CO2 in water as a ligand for extraction of rare earth elements (REEs) from waste streams, specifically fly ash and acid mine drainage (AMD). The process shifts the REE precipitation point to pH 5. This makes the process more cost effective, as the current process requires the pH be raised to 10 at a significant cost. By keeping the pH low, the remaining water after treatment can also be discharged back into the environment.

Application & Market Utility

Rare earth elements (REE) are in high demand for computers, batteries, cell phones, fluorescent lighting, defense applications, and healthcare innovations. Currently, the US imports most of its REEs from China, but a domestic source would be preferred, and our waste streams have tons of untapped potential. The concentrations of REEs are higher than in commercial mines and it's more economical to get it directly from the water.

Next Steps

Procuring permissions to test on more waste ponds in the Pennsylvania area. Seeking licensing opportunities.

TECHNOLOGY READINESS LEVEL 4-7

Seeking

Licensing | Research

Keywords

- rare earth element precipitation
- mineral carbonation
- acid mine drainage
- waste water
- fly ash

Researchers

Mohammad Rezaee
Assistant Professor of Earth & Mineral Engineering
Online Bio
Website

Sarma V. Pisupati
Professor of Earth & Mineral Engineering
Website

Originating College
College of Earth and Mineral Sciences

Office of Technology Management Contact
Douglas Gisewhite
drg206@psu.edu
814.865.6961