Colorado Science and Engineering Fair

2025 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: Developing an Economical Method of Extracting REM from Mine Effluent Water

Finalist's Name: Juakin Sawatzky

School and City: Liberty School, Joes

Sponsor's Name: Linda Fogale

Category: Earth & Environmental Sciences

Division: Senior (grades 9 - 12)

Abstract (250 words or less):

The purpose of this project is to determine an economical way of absorbing rare earth metals from effluent mine water. The hypothesis is with analysis of what things can absorb rare earths, then a method for filtering the effluent mine water can be developed, that is both efficient and cost effective. Research was made to find the materials that attract rare earths, once a list of materials was made, then the materials that weren't costly were kept for the absorbent. Then, tubes that would hold the absorbent so that they don't fall out into the catching tray. The effluent mine water was then measured out into 100ml so that when the water was taken for analysis later it would be easier to make the conversion factor for its presence. The water was measured out the different absorbents, sphagnum moss, activated carbon, the sodium and hydrogen resins, were then measured for the amount of absorbent per ml of mine water. The sodium and hydrogen resins were used as a baseline for how much of the rare earths should be absorbed. Then trials were held to see how much of the mine water would be absorbed per absorbent. The most effective was the sphagnum moss, saturated, and the worst was the activated carbon. Sphagnum moss, saturated, was able to absorb close to 80% of the total rare earths present. Activated carbon absorbed little to none of the present rare earth elements. In conclusion the sphagnum moss was the most effective and it was also cheap to obtain.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature: Date:

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. **A signed copy of this form must be included in your notebook.**