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Title: Synthesis of Porous Material and Separation of Rare Earth Metals

Abstract:

Rare earth elements (REEs) are essential materials with unique magnetic, catalytic, and luminescent properties that are widely utilized in various industries and modern technologies. The global supply of REEs is limited, necessitating a coordinated effort to enhance supply chain resiliency, recyclability, and reusability of existing sources. Our research focuses on developing methods for the separation of REEs using metalloorganic frameworks (MOFs). MOFs are valuable materials for molecular storage, catalysis, and filtration.

This poster will present the synthesis of porous materials containing rare earth elements such as lanthanum, gadolinium, and terbium. These materials were synthesized using solvothermal methods at 110°C and characterized by IR spectroscopy and X-ray diffraction studies. Suitable crystals for diffraction studies were obtained for gadolinium and terbium. The linkers used were 4-aminopteripthalic acid for gadolinium and 2-Amino[1,1' Biphenyl] 4,4' Dicarboxylic acid for terbium, with both elements exhibiting a coordination number of eight. As anticipated, the pore sizes were larger for the terbium complex due to the longer linker.

We aim to present some ICP-OES data for separation efficiency, although we are still in the process of obtaining this data.