

RE-cycle Efforts for Nationally Critical Elements using alkoxy ligands for extraction

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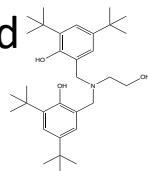


Problem:

Currently only 1% of the Nationally Critical RE-containing consumables are recycled every year.

Goal:

Explore the utility of the H₃-AM-DBP₂ ligand and determine if it could lead to extraction methods for certain lanthanide precursors.



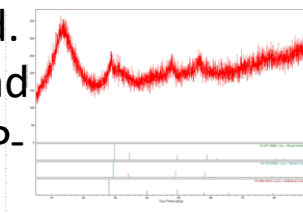
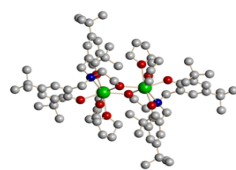
Method:

- Reactions between H₃-AM-DBP₂ and Ln(NR₂)₃ were crystallized and analyzed via Single Crystal XRD.
- Extraction procedures were analyzed via PXRD and ICP-MS.



Results:

- Developed a novel family of Ln(AM-DBP₂)₃ compounds.
- Y and La amide precursors were reacted with H₃-AM-DBP₂ and solution crystallized.
- Equal concentrations of La and Y oxide were observed via ICP-MS and PXRD.



Future Work:

- Exploit variations in structural nuclearity to determine optimal extraction procedures such as TLC and Column Chromatography.
- Explore isolation of Ln vs transition metals with H₃-AM-DBP₂.
- Refine ligand for improved selectivity with lanthanide precursors.