



# Soy Ionic Liquid

Airable Research Lab has developed a soy-based ionic liquid for extracting critical materials such as rare earth elements. Ionic liquids are used in a variety of industries for a range of applications, including separations, lubricants, electrolytes, and solvents. Ionic liquids are often free of volatile organic compounds (VOCs) and have high thermal and electric conductivity. However, many commercially available products contain hazardous and toxic inorganic anions and have poor biodegradability. Airable's soy-based formulation maintains good performance while addressing environmental concerns.

## THE TECHNOLOGY

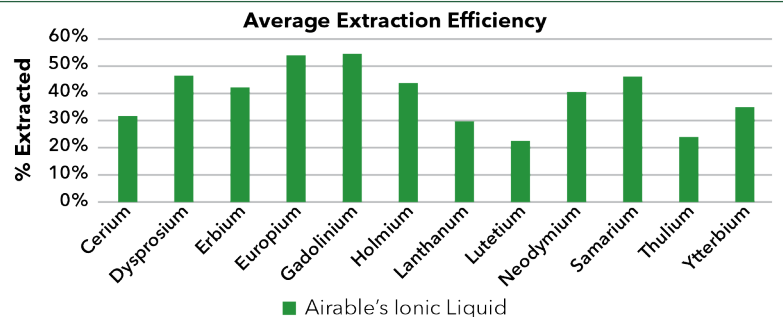
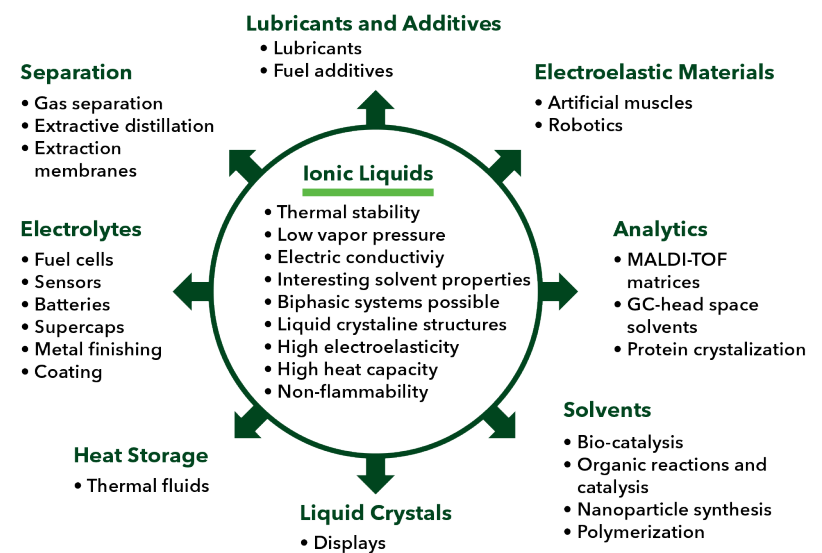
Airable's soy ionic liquid leverages the anionic component of soy fatty acid complexed with a quaternary ammonium cation. The ionic liquid maintains good hydrophobicity to allow for easy separation and recovery between batches. In preliminary trials, the ionic liquid was carried through three coal ash extractions, demonstrating the potential of reusability in industrial applications. Airable's ionic liquid contains 43% soy content and extracts approximately 40% of all rare earth elements from a milled coal fly ash matrix.

## THE BENEFITS

- Reduces potentially toxic components
- Improves hydrophobicity, making the liquid easier to recover and reuse
- Supports industry's shift toward circularity

## STATUS AND AVAILABILITY

The first round of testing has shown promising results. The formulation can be optimized and tailored to an individual company's needs. Airable Research Lab filed a provisional patent in March 2021. Contact Airable to discuss partnership options.



Average extraction efficiency for Airable's ionic liquid carried through three coal ash extractions. The baseline of 100% extraction is based on elemental analysis of milled fly ash.

