



## **Forward Looking: Merging IDAES with Commercial Models**

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# Enhanced Optimization and Simulation Tools



- Our goal is deeper technological integration by,
  - Enhancing platform integration with IDAES for more comprehensive solutions.
  - Utilizing open-source capabilities within OLI to expand adoption and progress our joint technologies.
  - Leveraging synergies between PrOMMiS and existing DOE collaborations to accelerate platform growth and develop innovative solutions.

# A Thermodynamic Model for Complex Electrolyte Systems

Predictions validated using peer-reviewed measurements



# Current OLI/DOE Open-Source Projects

Project	Timeline	Description
	2022-2024	<ul style="list-style-type: none"><li>• Access to thermodynamic calculations via API</li><li>• API application support</li><li>• Industry application support</li></ul>
	Start in 2024	<ul style="list-style-type: none"><li>• DOE SBIR (Phase 1)</li><li>• Enable broad industrial use</li><li>• Incorporate water chemistry</li></ul>

# 10+years of Critical Materials Chemistry Development

- Founding member of CMI
- Driving innovation in extraction, purification, refining, and recycling
  - REE
  - Lithium
  - Nickel
  - Cobalt
  - Manganese

The periodic table shows the following elements highlighted in blue:

- Hydrogen (H)
- Lithium (Li)
- Sodium (Na)
- Potassium (K)
- Rubidium (Rb)
- Cesium (Cs)
- Francium (Fr)
- Beryllium (Be)
- Magnesium (Mg)
- Calcium (Ca)
- Strontium (Sr)
- Barium (Ba)
- Radium (Ra)
- Titanium (Ti)
- Zirconium (Zr)
- Hafnium (Hf)
- Tantalum (Ta)
- Tungsten (W)
- Rhenium (Re)
- Osmium (Os)
- Iridium (Ir)
- Platinum (Pt)
- Gold (Au)
- Mercury (Hg)
- Thallium (Tl)
- Lead (Pb)
- Bismuth (Bi)
- Polonium (Po)
- Astatine (At)
- Radon (Rn)
- Manganese (Mn)
- Chromium (Cr)
- Nickel (Ni)
- Copper (Cu)
- Zinc (Zn)
- Gallium (Ga)
- Germanium (Ge)
- Arsenic (As)
- Selenium (Se)
- Bromine (Br)
- Krypton (Kr)
- Xenon (Xe)
- Radon (Rn)
- Lanthanum (La)
- Cerium (Ce)
- Praseodymium (Pr)
- Neodymium (Nd)
- Promethium (Pm)
- Samarium (Sm)
- Europium (Eu)
- Gadolinium (Gd)
- Terbium (Tb)
- Dysprosium (Dy)
- Holmium (Ho)
- Erbium (Er)
- Thulium (Tm)
- Ytterbium (Yb)
- Lutetium (Lu)
- Actinium (Ac)
- Thorium (Th)
- Protactinium (Pa)
- Uranium (U)
- Neptunium (Np)
- Plutonium (Pu)
- Americium (Am)
- Curium (Cm)
- Berkelium (Bk)
- Californium (Cf)
- Einsteinium (Es)
- Fermium (Fm)
- Mendelevium (Md)
- Nobelium (No)
- Lawrencium (Lr)



Critical Materials  
Innovation Hub

# Summary

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2. Utilize open-source capabilities within OLI to expand adoption and progress our joint technologies.
3. Leverage synergies between PrOMMiS and existing DOE collaborations to accelerate platform growth and develop innovative solutions.