



Critical Materials Institute
AN ENERGY INNOVATION HUB

Technologies Adopted by Industry

Source diversification

- *Castable High-Temperature Ce-Modified Al Alloys*
U.S. Patent #9,963,770
Licensed to Eck Industries
First commercial sales August 2017
R&D 100 Award, 2017
FLC Tech Transfer Awards, 2017 and 2018
- *High-Performance Al-Ce Alloys Synthesized via Consolidation of Powder/Particulate Precursors*
Licensed to Eck Industries
- *Al-Ce-Based Metal-Matrix Composites*
Licensed to Eck Industries
- *Materials Designed for Structural Direct Write Additive Manufacturing of Molten Metals*
Licensed to Momentum Technologies, Inc.

Materials substitution

- *Additive Manufacturing of Bonded Permanent Magnets using a Novel Polymer Matrix*
Licensed to Momentum Technologies, Inc.
R&D 100 Award, 2017

Improved manufacturing efficiency, recycling and re-use

- *Membrane Solvent Extraction for Rare Earth Separations*
U.S. Patent #9,968,887
Licensed to Momentum Technologies, Inc.
Featured in GAO report 16-699 on Advanced Technologies
- *Selective Surface Modification of Nd₂Fe₁₄B Magnets to Achieve High Performance*
Licensed to Momentum Technologies, Inc.
- *Novel 3D Printing Method to Fabricate Bonded Magnets of Complex Shape*
Licensed to Momentum Technologies, Inc.



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Technologies Available

CMI scientists have created 120 invention disclosures. Many are available for licensing. The following list represents a handful of award winning and/or patented inventions that can be licensed. Parties interested in any CMI technologies and innovations are invited to contact Stacy Joiner at the Ames Laboratory at CMIaffiliates@ameslab.gov or by phone at 515-294-5932.

- *Acid-free Dissolution Recycling of Rare Earth Elements and Cobalt*
U.S. patent filed
FLC National Award, 2018; Mid-Continent Region Notable Technology Development Award, 2018
R&D 100 Award and special R&D 100 Award for Green Tech, 2018
- *Electrochemically Recycling Electronic Constituents of Value (eRECOV)*
U.S. patent #9,777,346
FLC Far West Region Award, 2016
Finalist for 2018 R&D 100 Awards
- *Developing Bulk Exchange Spring Magnets*
U.S. patent #9,691,545
- *Recovery of Dy-Enriched Fe Alloy from Magnet Scrap Alloy via Selective Separation of Rare Earth Elements*
U.S. patent #9,725,788
- *Engineering Caulobacter Surface Protein for Rare Earth Element Absorption*
U.S. patent #10,196,708
- *Methods of Separating Lithium-Chloride from Geothermal Brine Solutions*
U.S. patent #10,266,915