

SMaRT Center Weekly Digest

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News

[New US Climate Bill Seeks to Bolster Domestic Critical Minerals Supply Chain](#)

Senate Majority Leader Chuck Schumer (D-NY) unveiled a budget reconciliation bill entitled the Inflation Reduction Act of 2022. The bill includes an estimated \$369 billion in investments related to "climate change and energy security," including tax and other incentives to promote US production of electric vehicles, renewable energy technologies, and critical minerals, representing the "single biggest climate investment in US history" These provisions are intended to put the United States on a path to roughly 40 percent emissions reduction by 2030, but they also reflect economic and geopolitical objectives, including a desire to "lessen our reliance on China, ensuring that the transition to a clean economy creates millions of American manufacturing jobs, and is powered by American-made clean technologies."

[Auto companies would qualify for electric vehicle tax credits only if they move supply chains out of China. The industry warns that could be too ambitious.](#)

The Senate climate package poised for a vote as early as this week includes tax credits that slash the cost of electric cars by thousands of dollars — but only for buyers who purchase from companies that relocate their supply chains out of China and other nations with which the United States does not have a free-trade agreement. It is a heavy lift for an industry that has limited access to minerals and components crucial to the production of EV batteries.

[Tesla inks battery materials deals with two China suppliers](#)

Tesla Inc. has signed new long-term deals with two of its existing Chinese battery-materials suppliers, the latest move by automakers to secure supplies amid intensifying competition. Zhejiang Huayou Cobalt Co. and CNGR Advanced Material Co. signed pricing agreements with the electric-vehicle giant for supplies until the middle of this decade, according to separate stock-exchange statements from the companies.

[MP Materials profit more than doubles on higher rare earths prices](#)

Rare earths miner MP Materials Inc reported a better-than-expected quarterly profit on Thursday due to rising demand and prices for the materials used to make electric vehicles and a range of consumer goods. The Las Vegas-based company posted second-quarter net income of \$73.3 million, or 38 cents per share, compared to \$27.2 million, or 15 cents per share, in the year-ago quarter.

[MP Materials Reports Second Quarter 2022 Results](#)

Second Quarter 2022 Financial and Operational Highlights (table)

[Lynas to invest \\$345m in rare earths mine to tap demand](#)

Australia's Lynas Rare Earths Ltd on Wednesday unveiled plans to invest A\$500 million (\$345.40 million) to expand capacity at its Western Australia-based Mt Weld mine, in an attempt to meet market demand for rare-earth materials. Mt Weld mine has deposits of rare-earth elements neodymium (Nd) and praseodymium (Pr). Lynas, the world's largest producer of rare-earth outside China, targets a feedstock

production capacity of 12,000 tonnes per annum NdPr equivalent in 2024 from the expansion, pushing on its previously announced 2025 growth plan for Mt Weld.

[Albemarle studying ways to recycle lithium in North America](#)

Albemarle Corp on Thursday said it is studying ways to develop a battery recycling business in North America and believes there would be many similarities with its current lithium operations.

“We’re evaluating just how we partner, invest and develop that supply chain,” Eric Norris, head of Albemarle’s lithium division, said on a Thursday conference call after the company posted better-than-expected quarterly results. “Many of the technologies are practiced in our existing operations.”

[GM prepaying Livent \\$198 million for guaranteed lithium supply](#)

General Motors Co is prepaying Livent Corp \$198 million for a guaranteed six-year supply of lithium, a deal that reflects the auto industry’s rising worry about a tightening market for the electric vehicle battery metal. Prepaying cash for a guaranteed metal supply is unusual in the mining industry. The deal shows GM’s eagerness to ensure it has sufficient raw materials to meet its goal of producing 1 million EVs annually in North America by 2025.

Column of the Week

[Disconnect between rare earth stock and commodity prices is a value pointer](#)

Rare earth stocks, like the rest of the mining sector, have been sold down for much of the past six months, but three clues can be found, which point to the potential for a strong recovery...

Select Articles

[Fungal biorecovery of cerium as oxalate and carbonate biominerals](#)

In this research, biomass-free spent culture media of *Aspergillus niger* and *Neurospora crassa* containing precipitant ligands (oxalate, carbonate) were investigated for their potential application in biorecovery of Ce from solution. This work provides new understanding of fungal biotransformations of soluble REE species and their biorecovery using biomass-free fungal culture systems and indicates the potential of using recovered REE as precursors for the biosynthesis of novel nanomaterials.

[Deep Eutectic Solvents \(DESS\) for Green Recycling of Wasted Lithium-Ion Batteries \(LIBs\): Progress on Pushing the Overall Efficiency](#)

Deep eutectic solvents (DESS) have recently emerged as a new class of green solvents that could potentially be applied for the lithium-ion batteries (LIBs) recycling industry due to their capability to leach the active materials without the introduction of environmentally hazardous reagents. Herein, we

briefly introduce the overall process of using DESs for LIBs recycling and specifically focus on the efficiency of each step. Current fundamental understandings and new experimental approaches to enhance the efficiency of the leaching process, the extraction process, and reusability are summarized.

Funding Opportunities

[DE-FOA-0002620 CARBON ORE PROCESSING](#)

Funding entity: Department of Energy (DOE)
Office of Fossil Energy and Carbon Management (FECM)

Award: DOE share (maximum): \$1,000,000 (80%)
Cost share: \$250,000 (20%)
Anticipated No. of Awards: 3 for each area of interest
Period of Performance: 24 months

Deadline: Full Applications (single stage): 10/06/2022 11:59:59 PM ET

Areas of Interest: **Area of Interest 1 - High Value Graphitic Products from Coal and or Coal Wastes**

Technical Elements

- Discussion of the end use application, expected market size, and market compound annual growth rate (CAGR);
- High level techno-economic analysis;
- Block flow diagram illustrating conversion process and process inputs/outputs;
- Technical performance targets for the coal-derived material;
- Comparison between coal-derived material performance targets and a business as usual base case;
- Experimental plan to quantify technical performance;
- Identification of knowledge gaps;
- Experimental plan to fill-in knowledge gaps, as applicable; and
- Experimental plan to determine fate of potentially hazardous species in the feedstock, including:
 - Plan to quantify how the species partition between any gas or liquid byproducts and the final manufactured product itself; and
 - A discussion of whether there is a measurable release of potentially hazardous species after the high value carbon product enters service.

Anticipated Technology Readiness Level (TRL)

Beginning of project:

- TRL 3: Analytical and experimental critical function and/or characteristic proof of concept.

- TRL 4: Component or system validation in laboratory environment.
- End of project: Technologies should have a goal to advance at least one TRL:
- TRL 4: Component or system validation in laboratory environment.
 - TRL 5: Laboratory/bench scale, similar system validation in relevant environment.

Success Metric(s)

1. Conducting a techno-economic analyses commensurate to the technology readiness of the proposed technology.
2. Quantifying the performance of the carbon product in its intended end use application and comparing it to a business as usual base case.

Area of Interest 2 – Coal-Derived Carbon-metal Composites

Technical Elements

- Discussion of the end use application, expected market size, and market CAGR;
- High level techno-economic analysis;
- Block flow diagram illustrating conversion process and process input/output;
- Description of analytical techniques by which the interfacial phases are characterized;
- Technical performance targets for the carbon-metal composite;
- Comparison between carbon-metal composite performance targets and existing business as usual base case;
- Experimental plan to quantify technical performance;
- Identification of knowledge gaps;
- Experimental plan to fill-in knowledge gaps, as applicable; and
- Discussion of the fate of potentially hazardous species, including:
 - Plan to quantify any hazardous species released during the creation of the carbon-metal composite; and
 - Plan to quantify any hazardous species released when the carbon-metal composite is placed into its intended end use application.

Anticipated Technology Readiness Level (TRL)

As in Area of Interest 1

Success Metric(s)

As in Area of Interest 1

[DE-FOA-0002810 Request for Information on Advanced Energy Manufacturing and Recycling Grant Program Department of Energy](#)

Funding entity: DoE Office of Manufacturing and Energy Supply Chains, in collaboration with DoE Office of Energy Efficiency and Renewable Energy Advanced Manufacturing Office

Description: In this Request for Information, the U.S. Department of Energy seeks information about how design and implementation of the Advanced Energy Manufacturing and Recycling Grant Program can best support community development, catalyze economic revitalization, create good-paying jobs, and support investment in local infrastructure in communities where coal mines and coal power plants have closed. This Request for Information also seeks information regarding how this Program can best facilitate transition of existing assets, infrastructure, and workforce capabilities to provide the foundation for sustained future economic growth.

Deadline: Sep 16, 2022

[NSF Division of Earth Sciences \(EAR\) Postdoctoral Fellowships](#)

Funding entity: NSF

Description: Fellowship proposals that address questions at the intersections of several EAR disciplinary programs, such as interdisciplinary critical zone (CZ) science or topics related to Cooperative Studies of Earth's Deep Interior (CSEDI), are also appropriate. The program supports researchers for a period of up to two years with fellowships that can be taken to the institution of their choice (including institutions abroad). The program is intended to recognize beginning investigators of significant potential, and provide them with research experience, mentorship, and training that will establish them in leadership positions in the Earth Sciences community.

Deadline: Nov 02, 2022