

SMaRT Center Weekly Digest

August 19, 2022

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News

[US DOE launches US\\$675 million critical minerals R&D program, calls for public input on direction](#)

China is a big source of the raw material and also accounts for about 60% of natural graphite production capacity and 90% of the synthetic variety. Making anodes is energy intensive, it produces a lot of emissions and the future of the technology is uncertain, making it “very challenging” to work around such content requirements, according to Bush.

[Energy can also be recovered from discarded batteries](#)

A group of Taiwan-based researchers have figured out how to extract residual energy from waste batteries in an efficient manner. To try to recover the remaining energy, the Taiwanese team tested a method called “self-adaptive pulse discharge” (SAPD) that can be used to determine the optimal values of two key parameters – pulse frequency and duty cycle – that determine the discharge current from the discarded batteries. A high discharge current amounts to a high amount of recovered energy.

[DARPA critical minerals competition uses AI to accelerate analytics](#)

DARPA has partnered with the U.S. Geological Survey (USGS) to explore the potential for machine learning and artificial intelligence tools and techniques to accelerate critical mineral assessments. The goal is to significantly speed up the assessment of the nation’s critical mineral resources by automating key steps in the process.

[China hikes 2022 rare earth quota by 25% on rising demand](#)

China raised its annual rare earth mining output quota by a quarter to a fresh record high in the wake of rising global demand. The full-year rare earth mining output quota has been set at 210,000 tonnes, up 25% from 168,000 tonnes in 2021.

Column of the Week

[The U.S. has a lot of catching up to do on critical energy minerals](#)

...The Chinese government, given its authoritarian, one-party nature, is able to plan and pursue huge national policy objectives over decades and maintain continuity while doing so. America’s democratic republic changes governments and ruling parties with great frequency, and the policy objectives tend to shift with them. This issue becomes especially perplexing and difficult to overcome given that China already enjoys such a dominant position in the production, processing and supply chain management for many of these critical energy minerals...

Technical Papers

[Substituted diamides of dipicolinic acid as extractants and ionophores for rare earth metals](#)

Newly synthesized diamides of dipicolinic acid are capable of extracting scandium similarly to the heavy lanthanides, while yttrium is extracted together with light group lanthanides. These new ligands are also effective ionophores to produce potentiometric sensor membranes with significant potentiometric response towards scandium, yttrium and lanthanides in 10^{-7} – 10^{-3} mol/L concentration range in nitric acid solutions.

[Aspects of rare earth element geochemistry of the Pond Creek coalbed, Pike County, Kentucky](#)

The chemistry of rare earth elements (REE) and selected critical elements was examined in the high volatile A bituminous Pond Creek coal in Pike County, Kentucky. The Pond Creek coal has been one of the most important coal resources in eastern Kentucky. The concentration of the REE and their internal distribution (light REE/heavy REE) varies between lithotypes through the coal, ranging from <300-ppm REE at the top of the coal to >1000-ppm REE in the bright lithotype (zone 4) in the middle of the coal.