1 of 1



DAVID MAMARIL HOROWITZ
david.horowitz@bgdailynews.com

As the U.S. seeks new means of extracting rare earth elements, Western Kentucky University's Advanced Minerals Institute has partnered with a distinguished private research university in Pennsylvania to further develop a process of doing so.

The project, spearheaded by a multidisciplinary research team at Lehigh University through a $2.5 million Department of Energy grant, will analyze waste byproducts from three coal-powered power plants over around three years, according to project leaders. Byproducts could potentially include rare earth elements and lithium, highly valued and utilized by industries such as those for semiconductors and batteries.

Lehigh University researchers will further develop a process to extract elements from the coal combustion residues — fly ash likely being the most significant, and the others being bottom ash, leachate and wastewater streams, said the project's principal investigator Zheng Yao, a researcher at Lehigh University. AMI, a lab that's part of WKU's Applied Research and Technology Program and has experience measuring the elements, will analyze samples to characterize and quantify them.

"I'm very excited for it because even with how the current political situation is, batteries and clean energy, they're the future — it's important," said AMI Lab Manager Stephanie Hagan, a primary investigator of the project. "If we can use waste material that we have sitting here in our country just hanging out, if we could use that to produce our own batteries or whatever electronic devices need to be used, that would be great."

The U.S. Department of Energy previously deemed certain materials and elements as critical based on import data and the domestic supply chain, known as Critical Minerals and Materials— and rare earth elements (REEs) and lithium are a smaller group among those, Yao said.

" … In order to provide a domestic supply chain of the CMMs, we need to explore a little bit further beyond the traditional resources for CMMs — 'traditional' meaning a mine that the CMM resources were being extracted (from), refined and then supplied," Yao said.

Some 70 million to 100 million tons of coal ash are generated annually nationwide, according to the National Energy Technology Laboratory. Notably, the concept being tested, electrodialytic filtration, has a technology readiness level of three — which means it's been proven by a very limited number of lab tests — and the project aims to raise that level to four, Yao said.

(Fly ash) hasn't really been characterized regarding rare earth elements or with lithium, and we know they exist — because lithium is found in coal — but no one's ever really tested to see how much of these rare earth elements are in these coal combustion residues," Hagan said.