

## **EGU24 Press Release: Pyrite, also known as fool's gold, may contain valuable lithium, a key element for green energy**

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There's a reason airlines won't let you put your laptop in your checked luggage; the lithium-ion battery poses a serious fire hazard. But why? Lithium is incredibly reactive. For instance, pure lithium violently interacts with seemingly innocuous water, releasing heat and forming highly flammable hydrogen. This reactivity, however, is exactly why lithium makes a great material for batteries, and why it is a critical mineral for the green energy transition. Lithium-ion batteries are widely used in electric vehicles. Plus, they can store energy produced by renewable resources like solar and wind.

In recent years, lithium demand has skyrocketed. Primary sources for lithium like pegmatites and volcanic clays are well understood, but finding other stores that are safe and economical to exploit would be helpful. To that end, a team led by researchers from West Virginia University is exploring whether previous industrial operations (e.g., mine tailings or drill cuttings) could serve as a source of additional lithium without generating new waste materials. Shailee Bhattacharya, a sedimentary geochemist and doctoral student working with Professor Shikha Sharma in the [IsoBioGeM Lab](#) at West Virginia University, will present the team's findings next week during the European Geosciences Union (EGU) General Assembly 2024.

The study focuses on 15 middle-Devonian sedimentary rock samples from the Appalachian basin in the U.S. The team found plenty of lithium in pyrite minerals in shale, Bhattacharya said, "which is unheard of."

Though the geologic literature lacked information on the intersection between lithium and sulfur-rich pyrite, the electrochemical and engineering world has already begun to look at how lithium-sulfur batteries could replace lithium-ion ones, Bhattacharya said. "I am trying to understand how lithium and pyrite could be associated with one another."

As it turns out, organic-rich shale may show potential for higher lithium recovery as a result of that curious interaction between lithium and pyrite. However, whether the observations can be extrapolated beyond samples from the current study site is not known. "This is a well-specific study," Bhattacharya cautioned. But, this work is promising because it hints at the possibility that certain shales



could be a lithium source that doesn't require new mines. "We can talk about sustainable energy without using a lot of energy resources," she said.

To learn more about this work, the poster presentation will be during ERE4.8 at EGU 2024 on Monday, 15 April, 16:15-18:00 CEST in Hall X4, X4.159

### **More Information**

When reporting on this story, please mention the EGU General Assembly 2024, which is taking place from 14-19 April 2024. This poster will be presented in session [ERE4.8](#) on Monday, 15 April, 16:15-18:00 CEST in Hall X4, X4.159. If reporting online, please include a link to the abstract: <https://meetingorganizer.copernicus.org/EGU24/EGU24-369.html>

Caption: [The Marcellus Shale is a Middle-Devonian unit found in the Appalachian Basin that contains pyrite.](#)

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### **More information**

The European Geosciences Union (EGU) is Europe's premier geosciences union, dedicated to the pursuit of excellence in the Earth, planetary, and space sciences for the benefit of humanity, worldwide. It is a non-profit interdisciplinary learned association of scientists founded in 2002 with headquarters in Munich, Germany. The EGU publishes a number of diverse scientific journals, which use an innovative open access format, and organises a number of topical meetings, and education and outreach activities. Its annual General Assembly is the largest and most prominent European geosciences event, attracting over 18,000 scientists from all over the world. The meeting's sessions cover a wide range of topics, including volcanology, planetary exploration, the Earth's internal structure and atmosphere, climate, energy, and resources. The [EGU General Assembly 2024](#) is taking place in Vienna, Austria and online from 14-19 April 2024. For information and press registration, please click [here](#).

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