# Direct Electrochemical Extraction of Lithium from Spodumene Ores ID# 2021-5333





### Seeking

Licensing |

#### Keywords

- Electric Vehicle
- Li-on Batteries
- Electronic Devices
- Lithium
- Spodumene Ores
- Electrochemical Leaching

### Researchers

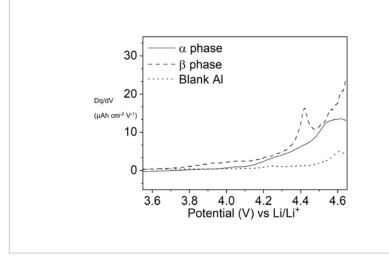
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### **Technology Summary**

Penn State researchers are developing an electrochemical leaching method that directly extracts lithium from  $\alpha$  phase spodumene without the need for phase transformation, offering a more energy-efficient and environmentally friendly approach to lithium extraction. The system consists of a current collector with lithium-bearing materials, carbon or metal-based electrodes, and an electrolyte. Applying an oxidation voltage to the current collector allows for the electrochemical leaching of lithium ions into the liquid phase. To improve the leaching process, a promoter such as O2, O3, H2O2, and others, can be added. Additionally, a multi-functional current collector with a large surface area and hydrogen peroxide production capability is introduced for scale-up leaching. The method also enables efficient extraction of lithium from various sources other than ores, including from waste streams and recycled materials.

# Application & Market Utility

This innovation can be widely used in industries that are producing lithium for use in Li-ion batteries for electronic devices and electronic vehicles as well as for other applications that consume lithium such as aluminum alloys for airplanes and air-cooling systems.

# Next Steps

Seeking collaboration and/or licensing opportunities to further develop and establish commercial testing.



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