Cover Profile
doi.org/10.1002/batt.202000301

Chemistry Europe
European Chemical Societies Publishing

Controlled Lithium Deposition on Alq_3 Coated Substrate

Liu lab virtual meeting during COVID-19 time. Screen shot of a Zoom meeting in November 2020.

Invited for this month's cover picture is the group of Gao Liu in Lawrence Berkeley National Laboratory. The cover picture renders an artistic image comparing a randomly distributed Li metal deposition on a Cu substrate (upper left) vs. a uniformly distributed Li deposition on Alq_3-modified (Alq_3: tris-(8-hydroxyquinoline) aluminum) Cu substrate (lower right). Read the full text of the Communication (authored by Haoxiang Zhong, Yangzhi Zhao, Ting Zhang, and Gao Liu) at 10.1002/batt.202000126.

What is the most significant result of this study?

The initial Li metal deposition behavior can be significantly altered by changing the substrate surface chemistry. If the initial Li deposition on a substrate is not uniform, the irregularity will be carried on by continuing Li deposition and overall Li electrode will not be uniform. This is a major issue for Li metal electrodes. In our work, we demonstrate that the initial Li metal deposition is uniformly distributed across the substrate surface with ~100 nm coating Alq_3 (tris-(8-hydroxyquinoline) aluminum) on Cu. This finding is a step forward to make functional Li metal electrodes.

What are the main challenges in the broad area of your research?

Our research is centered at electrochemical energy storage and rechargeable batteries. The main challenges in this field are how to further increase the energy density of batteries, how to enhance batteries' lifetime, and how to make them cheaper and safer.

How can the findings of this work help to meet the challenges?

Rechargeable batteries made with Li metal electrode could have the highest capacity and energy. Controlling Li deposition is a major step toward making practical Li metal electrodes for rechargeable batteries application.

Fortunately, most of the experimental work had been finished before the pandemic hit, and Dr. Zhong was back in China. The team used a lot of online resources to communicate their thoughts and draft the manuscript as you can see in the group photo.