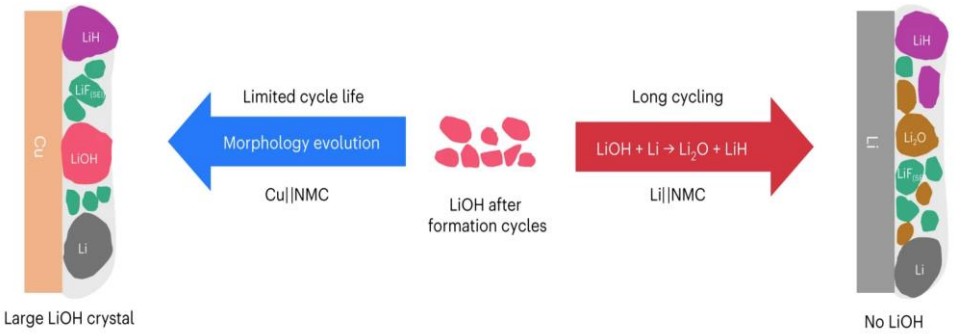
X-rays Reveal Elusive Chemistry for Better EV Batteries



Schematic picture of how the solid-electrolyte interphase component evolves during battery cycling based on X-ray diffraction results.

Scientific Achievement

High energy x-rays enabled scientists to probe the solid-electrolyte interphase, a sensitive chemical layer in batteries that's key to stabilizing lithium metal anodes.

Significance and Impact

By stabilizing the lithium metal anode, these batteries have the potential to provide more than double the energy density as traditional graphite anodes.

Research Details

- High energy x-ray diffraction and pair distribution analysis were performed at NSLS-II beamline XPD. Theory calculations were performed at CFN.
- Three components of the interphase were examined: lithium hydride, lithium hydroxide and lithium fluoride.
- Elucidation of the formation and evolution of these components revealed new opportunities for low-cost electrolyte development.

S. Tan, J.M. Kim, A. Corrao, S. Ghose, H. Zhong, N. Rui, X. Wang, S. Senanayake, B.J. Polzin, P. Khalifah, J. Xiao, J. Liu, K. Xu, X.-Q. Yang, X. Cao, E. Hu. Unravelling the convoluted and dynamic interphasial mechanisms on Li metal anodes. *Nat. Nanotechnol.* (2022).

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