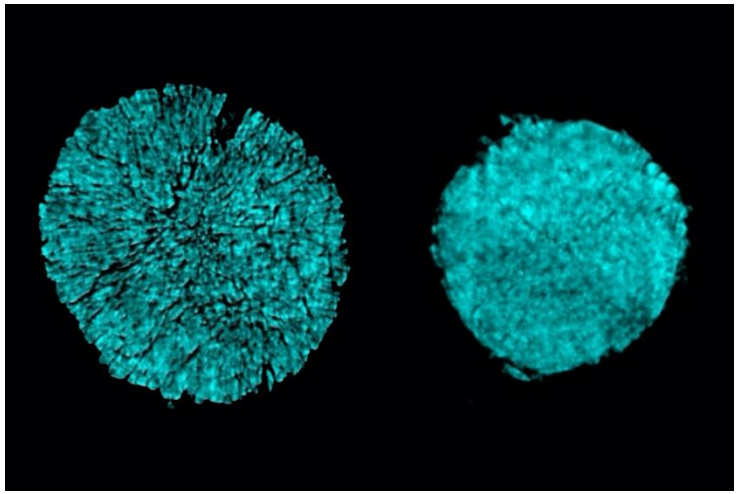
New Electrolyte Could Push Li-ion Battery Performance



The left image shows the cracking of a particle in one electrode of a battery cell that used a conventional electrolyte, while the right shows a particle using the novel electrolyte, which prevented most of this cracking. Both images were taken at the FXI beamline at NSLS-II.

Scientific Achievement

Scientists found a novel electrolyte that could enable a significant leap in the power-per-weight/volume of next-generation lithium-ion (Li-ion) batteries without sacrificing the cycle life.

Significance and Impact

Li-ion batteries are lightweight, portable power sources for many devices; however, to push their performance further, researchers needed to halt unwanted chemical and physical processes that take place under harsh electrochemical conditions. This study describes a new electrolyte that overcomes these issues.

Research Details

- Developed sulfonamide-based formulation, which reduces the cracking degradations of oxide cathodes.
- Found that the new electrolyte can greatly improve the cell-level energy density without compromising the cycle life.
- Used the FXI beamline at NSLS-II to study the cracks within cathode particles.

W. Xue, M. Huang, Y. Li, Y. G. Zhu, R. Gao, X. Xiao, W. Zhang, S. Li, G. Xu, Y. Yu, P. Li, J. Lopez, D. Yu, Y. Dong, W. Fan, Z. Shi, R. Xiong, C.-J. Sun, I. Hwang, W.-K. Lee, Y. Shao-Horn, J. A. Johnson, J. Li. *Nat. Energy* **6** (5), 495-505 (2021).

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