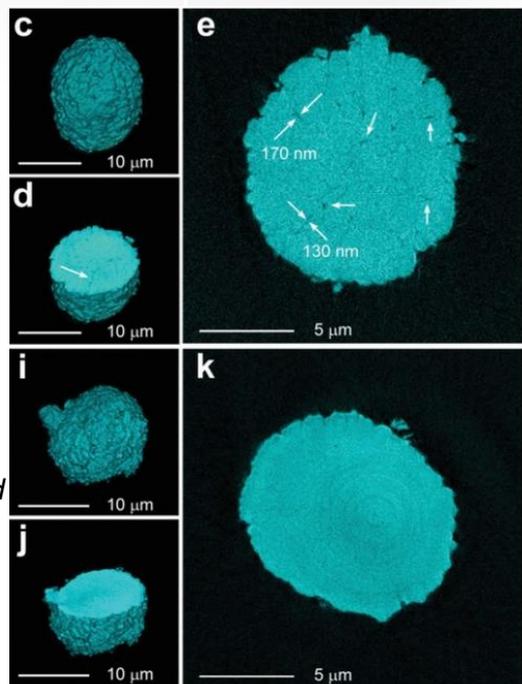


Next Cathode Material: Newly Designed and Freshly Grown

Particle morphology after cycling



Scientific Achievement

Scientists theoretically designed and successfully synthesized a new titanium (Ti), lanthanum (La) dual modified nickel-rich (Ni-rich) cathode material, which shows enhanced electrochemical performance.

Significance and Impact

This new dual-modified route provides a new pathway for commercialization of layered Ni-rich materials for next-generation lithium batteries.

Research Details

- The scientists predicted and successfully synthesized a Ti-doped and LaMO-coated composite cathode via a simple one-step calcination approach.
- The cathode showed enhanced rate capability and cycling stability, which can be attributed to the dual modification of Ti-doping and LaMO-coating.
- The transmission x-ray microscope at NSLS-II FXI beamline was used to characterize the new material's properties.
- This strategy could be extended to other high capacity cathode materials to increase their performance.

The images to left show reconstructions of single particles of the NMC cathode material (NMCs are specific family of cathode materials), while the images to right show a detailed an enlarged view of a slice of the particle.

H. Yang, H.-H. Wu, M. Ge, L. Li, Y. Yuan, Q. Yao, J. Chen, L. Xia, J. Zheng, Z. Chen, J. Duan, K. Kisslinger, X. C. Zeng, W.-K. Lee, Q. Zhang, J. Lu, *Adv. Funct. Mater.* **29**, 1808825 (2019).

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