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Ultrathin dense LiF coverage coupled with a near-surface gradient fluorination lattice enables fast-charging long-life 4.6 V LiCoO<sub>2</sub>

High-voltage LiCoO<sub>2</sub> with high volumetric energy density is vital for Li-ion batteries in consumer electronics, but its practical use at  $\geq 4.6$  V, especially for fast charging, faces challenges like oxygen evolution and cobalt dissolution due to rapid Li<sup>+</sup> diffusion during charge. Stabilizing the cathode interface at this voltage is crucial. Our innovative cathode near-surface fluorination reconstruction strategy enhances the stability of 4.45 V LCO, enabling operation at 4.6 V during fast charging, thus extending battery lifespan.

### As featured in:



See Chengmeng Chen, Feng Pan, Zhong-Shuai Wu *et al.*, *Energy Environ. Sci.*, 2024, **17**, 2765.