Advances in Multiscale Fracture of Lithium-Ion Batteries (Postprint)

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Abstract

Fracture in lithium-ion batteries can compromise the structural integrity of the cell. Both particle-level and electrode-level fractures have been demonstrated to exert profoundly detrimental effects on battery electrochemical performance and safety. Investigating fracture mechanisms is therefore of paramount importance for preventing battery fracture. Accordingly, this study synthesizes recent research on fracture mechanisms across various electrode materials, elucidates the intimate relationship between electrode material fracture and battery aging, and examines fracture phenomena at both particle and electrode scales along with their impacts on electrochemical performance. This work aims to provide deeper insights into the interplay between mechanical fracture and battery performance, thereby advancing the design and development of highly stable and safe lithium-ion batteries.

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