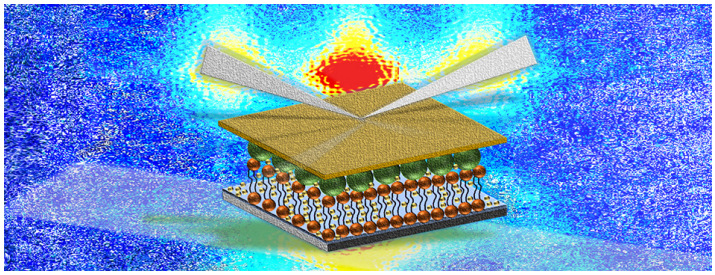

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Lithium Battery Electrodes Investigated by SANS

Mittwoch, 9. Oktober 2024 17:06 (7 Minuten)

Lithium batteries are ubiquitous in our daily lives, finding applications in cell phones, laptop computers, and automobiles. Each of these applications requires specific key features, such as increased capacity, compact size, rapid charging, and cost efficiency. Achieving these objectives involves material research that employs a diverse range of techniques to optimize each battery component, including electrode morphology, chemistry, and complex electrolyte formulations. Small Angle Neutron Scattering (SANS) plays a crucial role in this context. SANS is an ideal technique for investigating the nanoscale structure of batteries and their essential components in situ, as it easily penetrates the entire compound. Many surface properties of the electrodes are thus accessible using SANS. I will present some examples of how SANS is employed in battery research: (a) Investigating a cathode material with a protective carbon layer [1], (b) Studying metal phosphide anodes in a discharge/charge cycle [2], (c) Analyzing the formation of a protective SEI (Solid-Electrolyte Interphase) layer within an aqueous electrolyte during battery operation [3]. These examples are complemented by other methods that further support the significant findings for practical battery applications.
[1] X. He et al., J. Mater. Chem. A 2016, 4, 7230.
[2] X. He et al., Adv. Mater. Interfaces. 2017, 1601047
[3] X. Hou et al., Angew. Chemie Int. Ed.. 2021, 60, 22812.

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