

Special Issue

Synchrotron- and FEL-Based X-ray Methods for Battery Studies

Message from the Guest Editors

The purpose of this Special Issue is to provide an up-to-date overview of advanced analytical techniques available in large-scale facilities such as synchrotrons and free-electron lasers for the study of battery devices. The ultra-bright radiation from the infrared to hard X-rays range available at those international laboratories permits us to check, for instance, the electronic structure of selected atomic species and the local and average structure of electrode materials by using scattering and absorption techniques. Key factors governing the modification of the electrode/electrolyte interfaces can be studied by microscopy and also by surface-sensitive techniques such as photoelectron spectroscopy. The intriguing possibility of performing operando data acquisition (i.e. during charging and discharging loops of the battery) gives access to visualization of the full electrochemical process in realistic conditions. This Special Issue also focuses on advanced and efficient methods to extract all the relevant information in operando spectroscopic and crystallographic data by using chemometric tools.

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As the world of science becomes ever more specialized, researchers may lose themselves in the deep forest of the ever increasing number of subfields being created. This open access journal Applied Sciences has been started to link these subfields, so researchers can cut through the forest and see the surrounding, or quite distant fields and subfields to help develop his/her own research even further with the aid of this multi-dimensional network.

Editor-in-Chief

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