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IAPME Seminar

Synchrotron Radiation Study on 2D MXene-based Energy Materials

22 April 2025

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Venue: N23-3022
Time: 16:00 – 17:00
Hosted by: Prof. Hai-Feng LI

Abstract

The high brightness, tunability, and penetrating power of synchrotron radiation light sources with multiple techniques enable to explore numerous intricate properties of functional materials and devices at the nanoscale. Among various objects, two-dimensional layered transition metal carbides/nitrides (MXenes) with ultrathin layered structure and rich elemental variety are emerging as promising energy materials for energy generation and storage. In principle, MXenes can be produced by selective etching of the A-layers from their MAX phases, exhibiting a hexagonal crystal structure with transition metal carbide/nitride layers. Due to the involvement of both anions and cations in the etching reactions, it is still high challenge to obtain detailed information, such as phase evolution, lattice change, etching time scale, and so on. Therefore, it is highly desired to develop in-situ and operando techniques to further study realize the real-time monitoring of the complicated and fast etching process, as well as to better understand the real working mechanism of MXenes in energy storage and conversion applications. Here, we will present our recent results on MXene-based energy materials by means of various synchrotron radiation X-ray techniques and methods.

Biography

Prof. Li SONG received Ph.D. from Institute of Physics Chinese Academy of Science in 2006, then worked at University of Munich Germany, Rice University USA and Shinshu University Japan. In 2012, he was promoted to professor at University of Science and Technology of China, leading a multi-technique research team in Hefei Light Source. His research focuses on the development and application of synchrotron radiation-based new technologies and in-situ methods for various nanomaterials and nanodevices. So far, he has published about 400 scientific papers with over 50,000 citations (H-index 118), continuously nominated as the global highly cited scientist by Clarivate in 2019-2024.

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