The 130th GREEN Seminar

Pathway for high-energy and long-life sodium-ion batteries

Chair: Dr. Shoichi MATSUDA (GREEN)

Dr. Guiliang Xu

(Chemist, ANL, USA)

The growing demand for low-cost batteries for electric vehicles and grid-scale energy storage requires systems with fewer supply chain constraints. Sodium-ion batteries are a promising alternative to lithium-ion batteries due to the abundance of sodium. However, current sodium-ion cells still struggle to match the cost and energy density of $LiFePO_4$-based systems. This talk presents the development of high-capacity red phosphorus anodes and layered oxide cathodes at Argonne National Laboratory to achieve cell energy densities above 200 Wh/kg. Strategies to mitigate the large volume change of phosphorus anodes and doping approaches for high-voltage cathode operation are discussed. Multiscale in situ synchrotron X-ray diffraction and microscopy are used to reveal synthesis and structural mechanisms, enabling predictive design and synthesis of advanced sodium-ion battery materials.

Venue: Auditorium, 1F, NanoGREEN/WPI-MANA Bldg., Namiki-site

Date & Time: 10:40-11:20, Tuesday, 7 April. 2026

Language: English

Contact: MATSUDA.Shoichi@nims.go.jp