IAS ACERC 2026 International Seminar

Onsite seminar at YNU, Chemistry Building, Room 108,
on Nov.27th.2026

Lecture by Jeon-Soo Kim, Professor, Dong-A University and
Sang-Min Lee, Assistant Professor, Pohang University of Science and Technology (POSTECH)

Nov. 27th

15:00-16:00

Title: Effect of Precursors on the Properties of $NaNi_{1/3}Fe_{1/3}Mn_{1/3}O_2$ as a Cathode Material for Sodium-ion Batteries

Jeom-Soo Kim (Dong-A University)

16:00-17:00

Title: Gas-solid interactions in Sulfide-Based All-Solid-State Batteries:Implications for Interfacial Stability and Degradation

Sang-Min Lee (Pohang University of Science and Technology(POSTECH))

Title: Effect of Precursors on the Properties of $NaNi_{1/3}Fe_{1/3}Mn_{1/3}O_2$ as a Cathode Material for Sodium-ion Batteries

Hyo-Bin Ryu, Min-Jeong Jo, Hyungyeon Cha, and Jeom-Soo Kim*

Abstract: Sodium-ion batteries (SIBs) are considered promising candidates for cost-effective energy storage applications, especially for energy storage systems (ESSs). Layered $NaNi_{1/3}Fe_{1/3}Mn_{1/3}O_2$ (NFM), a cathode material for SIBs, has been extensively studied and has recently become commercially available. The electrochemical properties of NFM are significantly influenced by the characteristics of its precursors, which can be tailored by controlling the parameters in the co-precipitation process.
This study investigates the effect of precursor co-precipitation conditions on the physical and electrochemical properties of NFMs. Precursors were synthesized under various precipitation conditions. The physical characteristics of the precursor particles were found to be highly dependent on these parameters, which in turn significantly affect the properties of NFMs.

The correlation between precursor properties and the electrochemical performance of NFM will be presented in detail at the conference.

Title: Gas-solid interactions in Sulfide-Based All-Solid-State Batteries:Implications for Interfacial Stability and Degradation

Sang-Min Lee*

Abstract: Sulfide-based all-solid-state batteries are promising next-generation energy-storage systems owing to their high ionic conductivity, favorable mechanical properties, and compatibility with scalable manufacturing processes. However, their practical stability cannot be fully understood solely from the bulk properties of solid electrolytes. During material handling, cell fabrication, electrochemical operation, and abnormal operating conditions, gaseous species generated by chemical or electrochemical decomposition can migrate across the cell and trigger secondary reactions at spatially separated interfaces.
This talk discusses the importance of such gas–solid interactions in determining the degradation behavior of sulfide-based all-solid-state batteries. Moisture-derived species and sulfur-containing gases can propagate electrolyte degradation and induce unintended reactions with electrode and current-collector materials, even after the initial environmental exposure has ended. Similarly, gas-mediated interactions between charged cathode materials and sulfide electrolytes can amplify interfacial decomposition under elevated-temperature conditions. These observations suggest that apparently localized reactions may evolve into cell-wide degradation through the generation, transport, and subsequent consumption of reactive gases.

A broader interfacial-design perspective is therefore required to control both direct solid–solid reactions and indirect gas-mediated reaction pathways. Understanding these coupled processes provides a foundation for developing sulfide-based all-solid-state batteries with improved manufacturability, durability, and operational safety.