2025
PSK-이녹스 신진연구자 웨비나

2025년 12월 4일(목) PM 16:00 - 16:50 | 온라인 상

https://inha-ac-kr.zoom.us/j/84098782119

주 최 한국고분자학회 **주 관** 에너지 부문위원회 **후 원** INNOX

초대의 글

'PSK-이녹스 신진연구자 웨비나'는 우수한 연구역량을 가진 신진연구자를 발굴하여 교류의 장을 넓히고자 (주)이녹스의 후원과 한국고분자학회 주최로 마련한 온라인 세미나입니다. 이번 세미나에서는 고분자 분야 중에서도 특히 차세대 에너지 기술인 에너지 저장 분야에서 선도연구를 수행하는 신진연구자의 우수한 연구성과를 공유하는 자리를 마련하였으니 관심있는 분들의 많은 참여 부탁드립니다.

일정

PM 16:00 - 16:50

Ionic Liquid Electrolyte and Interfacial Design Strategies for LiF-rich Solid Electrolyte Interphase in Silicon-based Lithium-ion Batteries

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ABSTRACT: The growing demand for electric vehicles and energy storage systems has driven continuous efforts to increase the energy density of lithium-ion batteries (LIBs). The silicon (Si) anode has emerged as a promising alternative to conventional graphite owing to its exceptionally high theoretical capacity and natural abundance. However, the large volume changes of Si during cycling induce severe interfacial instability, leading to continuous electrolyte decomposition and rapid capacity fading. To overcome this interfacial instability, increasing the LiF content in the solid electrolyte interphase (SEI) has long been regarded as a cornerstone for achieving interfacial stability, as it provides chemical and mechanical robustness that effectively suppresses further electrolyte decomposition.
This talk introduces ionic liquid electrolyte and interfacial design strategies to tune SEI chemistry toward higher LiF content. In the ionic liquid electrolyte, the tailored cation exhibits high reductive stability, suppressing cation decomposition and facilitating the formation of anion-derived LiF-rich SEI layers. Meanwhile, the interfacial design through ionic liquid treatment enables uniform LiF-rich SEI coverage, mitigating interfacial heterogeneity and mechanical degradation during cycling. Such a homogeneous LiF-rich SEI enhances fast-charging performance and improves stability during calendaring and storage, leading to long-term durability. Overall, the rational design of LiF-rich SEI and its electrochemical improvement highlight the importance of SEI uniformity and chemistry for realizing next-generation Si-based LIBs.