

세미나 초록

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발표 주제	차세대 리튬이차전지 개발을 위한 계면제어 기술 연구
발표 내용	<p>Lithium metal batteries (LMBs) offer 3-5× higher energy density than conventional Li-ion batteries, yet dendrite formation and unstable interfacial reactions at lithium metal anodes significantly compromise battery safety, cycle life, and commercial viability. To address these fundamental limitations, interfacial control and protection technologies are urgently needed for stable lithium metal electrochemistry. Here, we present a Li-salt reservoir system using porous polymeric backbones with amphoteric moieties that enhance ion transport, effectively suppressing dendrite formation and dead lithium accumulation by replenishing Li^+ at ion-deficient sites. Additionally, we proposed biocompatible Li^+-coordinated polymers through water-based processing, creating hollow fiber channels that serve as artificial solid-electrolyte interphase layers to guide ion flux and promote uniform lithium plating. These organic composite-based interfacial engineering approaches tackle the dendrite and interface stability issues that have hindered LMB commercialization. Our work establishes that rationally designed organic materials can provide effective solutions to fundamental lithium metal anode challenges while offering environmentally sustainable processing routes for practical battery applications.</p>