

講演会のご案内

演題：**Frontier Engineering of Solid-State Li-Ion and Metal-Air Batteries for High-Energy-Density Storage**

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日時：2026年6月23日（火）14:30~15:30

場所：北海道大学工学部材料化学棟5階大会議室（MC527）

主催：北海道大学大学院工学研究院無機合成化学研究室

共催：北海道大学フロンティア化学教育研究センター（FCC）

協賛：電気化学会北海道支部

要旨：Achieving carbon neutrality by 2050 requires a rapid transition to renewable energy supported by advanced energy storage technologies. Conventional lithium-ion batteries (LIBs) have reached a practical energy density limit of $\sim 300 \text{ Wh kg}^{-1}$, driving the development of solid-state lithium-ion batteries (SSLBs) targeting $> 500 \text{ Wh kg}^{-1}$. Central to SSLBs is the solid-state electrolyte, which critically determines ionic conductivity and interfacial stability. This work highlights recent advances in electrolyte materials and interface engineering. Meanwhile, rechargeable metal-air batteries have emerged as promising candidates due to their ultra-high theoretical energy densities and compatibility with carbon-neutral cycles. Here, we provide a comparative perspective on SSLBs and metal-air systems, addressing their mechanisms, challenges, and prospects for next-generation energy storage.



• Solid-state lithium-ion batteries use solid electrolytes instead of traditional liquid electrolytes, which is expected to significantly improve the safety and energy density of batteries. However, solid-state batteries still face challenges in terms of cost and industry chain maturity.



• The theoretical energy density of metal-air batteries is extremely high, and they are expected to break through the current energy density bottleneck of lithium-ion batteries. However, there is still room for breakthroughs in terms of cycle life and charging speed.

連絡先：工学研究院応用化学部門 忠永清治（内線：6572）