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臺灣大學應用力學研究所  
演 講 公 告

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主 講 人：蔡秉均助理教授  
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講 題：Integrating Experiments and Calculations to Study Ceramics-based Battery Materials

摘 要： 如附件

主 持 人： 陳志鴻副教授

時 間： 114年04月28日（星期一）下午2時20分開始

地 點： 臺灣大學應用力學研究所國際會議廳

☆☆ 歡迎聽講，敬請張貼 ☆☆

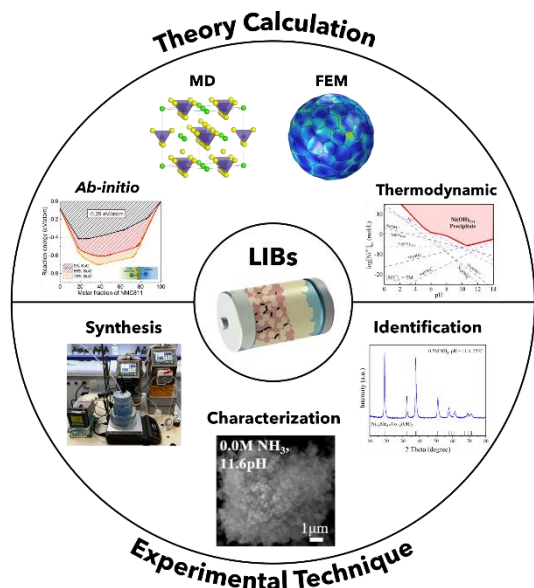
# Integrating Experiments and Calculations to Study Ceramics-based Battery Materials

Ping-Chun Tsai (蔡秉均)

National Taiwan University of Science and Technology

My research focuses on the design, synthesis, and characterization of advanced ceramic materials and devices for battery technologies, including electric vehicle batteries, grid-scale energy storage, and sustainable low-carbon manufacturing. To develop next-generation battery materials with high energy density, fast charge/discharge capability, enhanced safety, long cycle life, and low cost, I specialize in integrating experimental techniques with theoretical calculations.

These techniques include co-precipitation and sol-gel synthesis, electrochemical measurements, single-particle electrode analysis, laboratory-scale battery assembly and testing, first-principles calculations, and finite element analysis. My current work focuses on novel ion conduction mechanisms in solid electrolytes, the interfaces between solid electrolytes and electrodes, and the scalable manufacturing and characterization of commercial cathode materials for lithium-ion batteries. This integrated experimental and theoretical approach has enabled deeper understanding and targeted design of solid electrolytes and their interfaces with electrodes.



## Selected Publications

1. C.-M. Wang, C.-H. Hsu, J.-S. Yang, and **P.-C. Tsai\***, “*Ab initio* Study on Lithium Anode Interface Instability and Stabilization of Superionic  $\text{Li}_3\text{InCl}_6$  and  $\text{Li}_6\text{PS}_5\text{Cl}$  Solid Electrolytes”, *Journal of Power Sources*, 640, 236719, June 2025.
2. **P.-C. Tsai**, S. Mair, J. Smith, D. M. Halat, P.-H. Chien, K. Kim, D. Zhang, Y. Li, L. Yin, J. Liu, S. H. Lapidus, J. A. Reimer, N. P. Balsara, D. J. Siegel, and Y.-M. Chiang\*, “Double Paddle-Wheel Enhanced Sodium Ion Conduction in an Antiperovskite Solid Electrolyte”, *Advanced Energy Materials*, 13 (7), 2203284, 2023. (IF: 27.80; N/M: 9/344, Citation: 22, Materials Science, Multidisciplinary) **Cover Feature**
3. **P.-C. Tsai**, B. Wen, M. Wolf, M.-J. Choe, M. Pan, L. Su, J. Cabana, K. Thornton, and Y.-M. Chiang, “Single-particle measurements of electrochemical kinetics in NMC and NCA cathodes for Li-ion batteries”, *Energy and Environmental Science*, 11, 860-871, 2018. (IF: 33.250; N/M: 1/250, Citation: 306, Environmental Sciences) **Energy and Environmental Science HOT Articles**