



澳門大學  
UNIVERSIDADE DE MACAU  
UNIVERSITY OF MACAU



應用物理及材料工程研究院  
INSTITUTO DE FÍSICA APLICADA E ENGENHARIA DE MATERIAIS  
INSTITUTE OF APPLIED PHYSICS AND MATERIALS ENGINEERING



UM 1981-2026  
萬行致遠  
奮進新程  
Strive Forward and  
Achieve Beyond

**IAPME**  
**Seminar**

## Celebrating the 45th Anniversary of the University of Macau: Phase Engineering of Intermetallic Compounds for Electrocatalytic Applications

**10 April 2026**



Prof. Qinbai YUN

The Hong Kong University of Science and  
Technology (Guangzhou)

Venue: N23-6009

Time: 14:00 - 15:00

Hosted by: Prof. Qing LI

### Abstract

Intermetallic compounds (IMCs) are regarded as excellent catalysts owing to their well-defined active site configurations and high structural stability. However, the precise modulation of active sites of IMCs for specific catalytic reactions remains a significant challenge. To address this, we have proposed phase engineering strategies for the precise synthesis of IMC nanomaterials, achieving fine control over their active site configurations and electronic structures, thereby enhancing their performance in various electrocatalytic applications. We developed general high-temperature annealing-based methods for preparing IMC nanomaterials, which exhibited outstanding performance for electrocatalytic nitrate reduction and water splitting. We further established wet-chemical synthesis strategies to prepare Pd-based IMC nanomaterials with controlled morphologies, where the synergistic modulation of crystal phase and morphology improved their alcohol oxidation performance. In addition, we also developed IMC-based nanomaterials with heterophase structures, including amorphous/IMC and alloy/IMC heterophase structures, to enhance their electrocatalytic performance owing to the synergetic effect of different phases and the unique active site configurations at phase boundaries. These studies provide new strategies for precisely regulating the atomic arrangement of IMCs and constructing high-performance electrocatalysts.

### Biography

Prof. Qinbai YUN is currently an Assistant Professor in Sustainable Energy and Environment Thrust at The Hong Kong University of Science and Technology (Guangzhou). He obtained his B.E. and M.E. degrees from Tsinghua University, and then earned his Ph.D. degree from Nanyang Technological University. After that, he worked as a Postdoc and Research Assistant Professor at City University of Hong Kong and The Hong Kong University of Science and Technology, respectively. His research interest focuses on the precise synthesis of low-dimensional metallic materials for applications in electrochemical energy conversion and electrosynthesis of fine chemicals. He has published 77 academic papers, including 25 papers as the (co-) first/corresponding author in Chem. Rev., Adv. Mater., Angew. Chem. Int. Ed., J. Am. Chem. Soc., Adv. Funct. Mater., and ACS Nano. He has been awarded “World’s Top 2% Scientists” (by Stanford University, 2024-2025) and Chinese Government Award for Outstanding Self-Financed Students Abroad.

Enquiry: [iapme.enquiry@um.edu.mo](mailto:iapme.enquiry@um.edu.mo)