澳門大學
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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

IAPME Seminar

Current research on fine structure regulation of semiconductors towards artificial photosynthesis

25 February 2025

Prof. Qing GUO
Xi'an Jiaotong University

Venue: N23-4018
Time: 10:00 – 11:00
Hosted by: Prof. Hui PAN

Abstract:

Drawing on the principles and structures of natural photosynthesis, converting H_2O and CO_2 into high-value chemicals and solar fuels through the artificial photosynthesis is one of the ideal solutions to resolve the energy crisis and environmental issues. However, to achieve efficient and highly selective solar-to-chemical energy conversion, the key lies in the development of high-performance photocatalysts. Semiconductor materials, because of their excellent light absorption properties, unique quantum confinement characteristics, and simple synthesis methods, have attracted widespread attentions in the field of artificial photosynthesis. Nevertheless, current semiconductor-based artificial photosynthesis systems face challenges such as a lack of reactive sites and sluggish charge-carrier dynamics, which lead to low reaction efficiency and selectivity. To this end, we have achieved efficient and highly selective conversion of solar energy into chemical energy by finely regulating the material structure, introducing catalytic active sites, and promoting charge-carrier dynamics.

Biography:

Professor Qing GUO received her Bc. D in LanZhou University in 2014, and Ph.D. in Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Republic of China, under the guidance of Academician Wu Li-Zhu in 2019. Currently, she is a Assistant Professor of the School of Chemistry at Xi'an Jiaotong University. She hosted and participated in several National Natural Science Foundation of China. Her achievements include the publication papers in scientific literature, including *Chem*, *Angew. Chem. Int. Ed*., *ACS Catal*., *J. Mater. Chem. A*, and so on. Her research interests are primarily in solar-light-driven redox reactions based on II-VA semiconductor nanocrystals and halide perovskite, including H_2 evolution, CO_2 reduction and organic synthesis.