Presentation by Professor Wai-yeung Wong

Presenter：Professor Wai-yeung Wong（Hong Kong Polytechnic University, China）
Title：Photofunctional Organometallic Materials for Solar Energy Conversion
Date：2025/11/27（Thu.）16:00–17:00
Place：Kagurazaka Campus No.10th building 1014 room

Abstract

Solar energy technologies have gained significant global attention as crucial facilitators for the green and sustainable development of human society and the economy. Organic materials hold great potential in solar energy conversion due to their advantages such as diverse molecular modification, pollution-free nature, low cost, solution processing, and flexible device fabrication. Our research focuses on developing new organometallic materials and investigating their performance in solar cells, solar evaporators and photocatalysis. Iridium and platinum-based molecules with high singlet-to-triplet conversion are explored to improve the exciton lifetime and diffusion length, while also optimizing the active layer morphology to enhance the efficiency of organic solar cells. Additionally, a new strategy is adopted that integrates multiple charge transfer mechanisms, including metal-to-ligand, ligand-to-metal, ligand-to-ligand, and intermolecular charge transfers, into an organometallic polymer. This approach aims to design highly efficient photothermal materials for solar evaporation applications. Interestingly, various organometallic 1D and 2D polymers also hold great promise as efficient photocatalysts in converting water to various useful chemicals. Hence, the development of new organometallic materials opens a meaningful pathway from molecular design to improving the solar energy conversion efficiency of photo-to-electric, photo-to-thermal and photo-to-chemical processes.

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