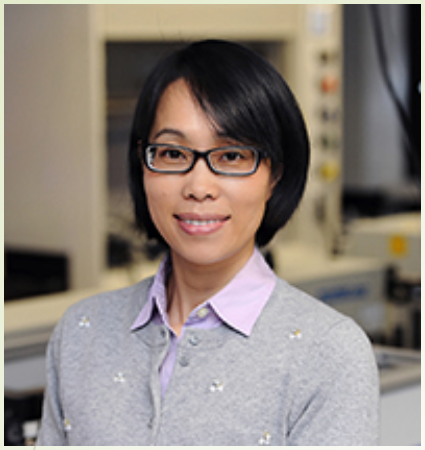
Materials Seminar



Prof. Jier Huang

Marquette University

Department of Chemistry

"Zeolitic Imidazolate Frameworks as Intrinsic Photocatalytic Materials"

Metal organic frameworks (MOFs) are an emerging class of nanoporous crystalline materials consisting of metal nodes coordinated by bridging organic linkers. Their inherent porous nature, large surface area, and tunable cavities have led to various applications including gas separation and storage, chemical sensing, and heterogeneous catalysis. Zeolitic Imidazolate Frameworks (ZIFs) are a subclass of MOFs which are particularly attractive for catalysis application due to their exceptional thermal and chemical stability. Recent works have demonstrated their catalytic applications for a variety of reactions including organic transformations, gas phase CO oxidation and hydrogenation, as well as photocatalytic reactions. While these examples evidently demonstrate the promise of ZIFs in heterogeneous catalysis, ZIFs in these systems are largely treated as inert hosts for reaction substrates or/and catalytic active species, resembling the roles of zeolites in catalysis. In contrast to these studies, our recent findings show that the framework of ZIF-67 exhibits an intrinsic photochemical response, featured by multiple absorption bands in UV-Visible-Near IR region and an exceptionally long-lived excited state due to the formation of a charge separated state. Because the function of ZIFs in photocatalysis is essentially dictated by its light harvesting ability and charge separation dynamics, these findings strongly suggest that ZIFs may be used as intrinsic photocatalytic materials rather than inert hosts. In this talk, I will discuss our recent progress in developing ZIFs as intrinsic heterogenous catalysts for light-driven H_2 generation.

Thursday, February 8th **Rm 1315 Chemistry**