

Molecular Materials for Sustainability and Human Health

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Metal-organic frameworks (MOFs), also known as coordination polymers and coordination networks, are an interesting class of crystalline molecular materials with potential applications. The modular nature of and mild conditions for MOF synthesis permit the rational structural design of numerous MOFs and the incorporation of various functionalities via constituent building blocks. In this talk, I will discuss our recent works on designing MOFs/coordination polymers for sustainability and human health. MOFs have enabled the rational synthesis of well-defined solid catalysts by not only facilitating the immobilization of known homogeneous catalysts but also allowing the discovery of new molecular catalysts that do not have homogeneous counterparts. Hierarchical organization of multiple active sites further enables cooperative catalysis with unprecedentedly high efficiency. MOFs/coordination polymers have also allowed the incorporation of multiple therapeutics or treatment modalities for chemotherapy, radiotherapy, gene, and immunotherapy of resistant cancers. Clinical translation of representative MOF/coordination polymer systems will be discussed.

A Short Biosketch of Wenbin Lin

Dr. Wenbin Lin is the James Franck Professor of Chemistry, Radiation and Cellular Oncology, and the Ludwig Center for Metastasis Research, and Comprehensive Cancer Center at the University of Chicago. Lin obtained his BS from the University of Science and Technology in Hefei, China and his PhD from the University of Illinois at Urbana-Champaign. He was an NSF postdoctoral fellow with Professor Tobin J. Marks at Northwestern University. Lin focuses on designing molecular materials for sustainability and human health, and has published close to 350 peer-reviewed articles. He has been among the most cited chemists several years in a row and was selected as one of the top 10 chemists in the 1999-2009 decade based on per article citations. Dr. Lin is founder of two clinical stage biopharmaceutical companies and has received numerous professional honors for his contributions to functional molecular materials.