Molecular Designed Solid Catalysts for Energy Conversion

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To realize efficient conversion of solar energy to chemical energy via photo/electro-chemical processes, one of the grand challenges is to develop low cost, highly active and stable catalysts. Our lab is interested in designing solid catalysts with molecularly defined structures and local environment photocatalytic and electrocatalytic water splitting and CO2 reduction. The insights obtained from uncovering the origin of the active sites and structure-activity correlation benefit the rational catalyst design to achieve high catalytic performances.[1-7] For example, cobalt phosphonate based metal-organic frameworks (MOFs) were synthesized to tune the metal-metal and metal-ligand distances. The resultant catalysts demonstrate high performances for photocatalytic and electrocatalytic oxygen evolution reaction (OER).[2,3] A review article was recently contributed by our group to summarize the recent key progress achieved including our own works in designing MOFs and COFs based molecular solid catalysts and the mechanistic understanding of the catalytic centers and associated reaction pathways for a broad range of reactions.[7]

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Short biography

Xu Rong received her Bachelor, Master and Ph.D. degrees in Chemical Engineering from National University of Singapore. She joined Nanyang Technological University (NTU) as an Assistant Professor in 2004 and was promoted to Associate Professor in 2010 and Professor in 2017. Her lab has actively worked in the field of catalysis for energy and environmental applications. To date, she have published over 150 papers in top tier journals including Journal of the American Chemical Society, Advanced Materials, Angewandte Chemie, Energy & Environmental Sciences, Science Advances, ACS Nano, Chemical Society Review and so on. Her citation and H-index are >9800 and 58 (Web of Science). She received Top-Cited Papers Award (2010 and 2011) from Elsevier for her paper published in Applied Catalysis B: Environmental. Recently, her work on metal sulfide photocatalyst was featured in a themed collection 'Celebrating excellence in Dalton Transactions – women of inorganic chemistry’ (2018), Royal Society of Chemistry. She is currently an Associate Editor of EnergyChem, a new journal of Elsevier. She is also an Editorial Board Member of ACS Sustainable Chemistry & Engineering. She has served as the Associate Chair Research (2011-2014) and Chair (2017-2019) of the School of Chemical & Biomedical Engineering, NTU. She is also the founding Director of Singapore Energy Centre (SgEC), an industrial consortium with its mission to develop innovative solutions to meet the growing energy demand through collaborations between academia and industry .