Western South Carolina Chapter of American Institute of Chemical Engineers

Proposed February 2021 Virtual/ZOOM Meeting and Presentation

Abstract:

The exploration of cost-effective heterogeneous catalysts to produce sustainable energy and value-added chemicals is at the heart of both fundamental and industrial catalysis research. In order to allow such a large family of materials to match the elegant and promising chemistry of their corresponding homogeneous and molecular prototypes, perhaps the ultimate design goal for heterogeneous catalysts is to simultaneously maximize the dispersion of the supported catalytic metals and to display desired intrinsic chemistry per metal atom. Such a vision, in fact, sees its immediate relevance in addressing some greatest challenges faced by today's catalyst industry. For example, the high price of noble metals, due to their low abundance and supply deficit, has hindered the commercial developments of many precious metal catalysts despite their otherwise great catalytic performances. For example, even when a catalytic nanoparticle has a tiny size of 3 nm, it is well accepted by the catalysis community that at least ~70 % of the catalytic metal atoms are not contributing to any given reactions. Improving the dispersion of the supported metal species seems to be the silver bullet for such a conundrum. However, unrationalized quests of higher dispersion of supported metal species may also lead to unnecessary compromises in catalyst performances. Therefore, working towards the catalyst design goal of simultaneously maximizing the dispersion of the catalytic metals and displaying desired intrinsic chemistry per supported metal atom presents both new opportunities and daunting tasks. In this talk, I will summarize my research findings from the last a few years in this active field.

Bio:

Ming Yang is currently an Assistant Professor in the Department of Chemical and Biomolecular Engineering at Clemson University. Ming Yang received his bachelor's degrees in Chemistry and Chemical Engineering from Nankai University and Tianjin University, respectively. Yang then completed his Ph.D. in Chemical Engineering at Tufts University, working with Dr. Miretta Flytzani-Stephanopoulos to advance an emerging research field called single-atom catalysis. Yang's group at Clemson University operates in the field of thermal- and electrocatalysis by developing cost-effective catalytic materials for environmental and energy applications. Before Clemson, he spent five years at General Motors R&D, performing independent catalysis research that bridged fundamental science and product implementation. He is an inventor of several patents that have been licensed to catalyst companies by General Motors. Yang has published his corresponding- and 1st-author research reports in peer-reviewed journals, including *Science, Nature Chemistry, Nature Communications, and Journal of American Chemical Society.* He has been serving as a board member of the *Michigan Catalysis Society* since 2017.