

DISTINGUISHED SPEAKER SERIES

Thermally Stable Single-Atom Catalysts for Catalytic Applications

By Prof Yong Wang

Recent advancements in the study of thermally-durable single atom catalysts (SACs) through atom trapping have garnered significant attention across various fields, including energy, environment, and material sciences. This presentation delves into our recent discoveries on the fundamental principles behind synthesizing SACs via atom trapping, optimizing the single atom site environment through hydrothermal treatment, and activating oxygen at near room temperature with CO treatment. Additionally, we discuss customizing the local environment to establish asymmetric coordination of single atoms. Our work extends to the synthesis of SACs from reducible oxides like ceria to non-reducible metal oxide supports such as MgAl₂O₄ spinel. We also highlight the creation of two-dimensional metal rafts using atom trapping, which enhances both atom efficiency and activity. Furthermore, we underscore the significance of thermally-stable SACs in diverse catalytic applications, emphasizing their dynamic behavior under reaction conditions and their potential to address the pressing issue of platinum group metal scarcity and carbon footprints.



Monday, 26 Feb 2024



15:30 to 16:30pm (SGT)



LT1 -- 5 Engineering Drive 2, Singapore
117579



Prof. Wang is Regents Professor and Voiland Distinguished Professor in Chemical Engineering at Washington State University (WSU) and a Laboratory Fellow and associate director of Institute for Integrated Catalysis at Pacific Northwest National Laboratory (PNNL). Prof. Wang received PhD degree in Chemical Engineering from WSU in 1993 and then joined PNNL in 1994 as a postdoc. Prof. Wang is best known for his leadership in the development of novel catalytic materials and reaction engineering to address the issues related to energy and atom efficiency for converting fossil and biomass feedstocks to fuels and chemicals. He is committed to exploring sustainable technologies that can address the energy, resource, and environmental challenges of today and the future. Prof Wang has authored 427 peer reviewed publications in lead scientific journals including Science, Nature, Nature group journals, JACS, Angew.Chem.Int.Ed, with 42,376 citations and H index of 97 (as of Feb.

13, 2024). He is the inventor on 290 issued patents including 111 issued U.S. patents (>90% licensed to industries). He is a fellow of AIChE (American Institute of Chemical Engineers), ACS (American Society of Chemistry), RSC (Royal Society of Chemistry), AAAS (American Association of the Advancement of Science), and NAI (National Academy of Inventors). He has won numerous awards including the 2021 ACS E.V.Murphree Award in Industrial Chemistry & Engineering, 2019 AIChE Catalysis and Reaction Engineering Practice Award, 2017 ACS I&EC Division Fellow Award, 2006 Asian American Engineer of the Year Award, Presidential Green Chemistry Award, and 3 R&D 100 Awards. He previously served as the chair of the ACS Energy & Fuel Division and as Director to the AIChE Catalysis & Reaction Engineering Division. Currently, he is the Co-Editor-in-Chief of Applied Catalysis B: Environment and Energy and Executive Editor of the Chemical Engineering Journal.