

## The Department of Chemical Engineering Presents:



# GANG WU

Department of Chemical and Biological Engineering  
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### *“Atomically Dispersed Single Metal Site Catalysts for Hydrogen Fuel Cells”*

Zoom meeting link: <https://rochester.zoom.us/j/98875611576> 87849

**ABSTRACT:** Proton exchange membrane fuel cells (PEMFCs) are leading candidates in utilizing clean energy resources for application in transportation, stationary, and portable devices. In PEMFCs, cathode catalysts are crucial for overall performance and durability due to kinetically slow oxygen reduction reactions (ORR). Because platinum (Pt), a state-of-the-art ORR catalyst, is rare and expensive, the development of high-performance platinum metal group (PGM)-free catalysts is highly desirable for future fuel cell technologies. Among various PGM-free catalyst formulations, metal and nitrogen co-doped carbon (M-N-C, M: Fe, Co, or Mn) catalysts have exhibited encouraging activity and stability in acidic media for the ORR, which possess great potential to replace Pt in the future. Therefore, based on our extensive experience in the field of ORR catalysis, the talk will comprehensively summarize the basic principles in the design and synthesis of M-N-C catalysts for durable, inexpensive, and high-performance PEMFCs with an emphasis on Co- and Mn-N-C catalysts to avoid Fenton reactions between  $\text{Fe}^{2+}$  and  $\text{H}_2\text{O}_2$ , which can generate free radicals and lead to the degradation of catalysts, ionomers, and membranes in PEMFCs. Furthermore, template-free 3D hydrocarbon frameworks as attractive precursors to advanced M-N-C catalysts will be discussed to enhance intrinsic ORR activities in acidic media significantly. The long-term performance durability of M-N-C cathodes will also be discussed extensively to provide potential solutions to enhance catalyst stability in PEMFCs. Finally, this talk will provide an overall perspective on the progress, challenges, and solutions of PGM-free catalysts for future PEMFC technologies.

**BIO:** Dr. Gang Wu is a professor in the Department of Chemical and Biological Engineering at the University at Buffalo (UB), The State University of New York (SUNY). He completed his Ph.D. studies at the Harbin Institute of Technology in 2004, followed by extensive postdoctoral training at Tsinghua University (2004-2006), the University of South Carolina (2006-2008), and Los Alamos National Laboratory (LANL) (2008-2010). Then, he was promoted to a staff scientist at LANL. He joined UB as a tenure-track assistant professor in 2014 and was quickly promoted as a tenured associate professor in 2018 and a full professor in 2020. His research focuses on functional materials and catalysts for electrochemical energy technologies. He has published more than 250 papers, including Science, Nature Catalysis, J. Am. Chem. Soc., Adv. Mater., Angew. Chem., Chem. Rev., and Chem. Soc. Rev. His papers have been cited more than > 27,000 times with an H index of 82 (Google Scholar) by Feb 2021. He holds more than a dozen U.S. patents on catalysts for fuel cells and ammonia technologies. He is currently leading and participating in multiple fuel cell, battery, and renewable fuel (e.g.,  $\text{NH}_3$ ) related projects with a total research funding of > \$5.0 M. Dr. Wu was continuously acknowledged by Clarivate Analytics as one of the Highly Cited Researchers in 2018, 2019, and 2020. He is an Associate Editor for RSC Advances.

**Wednesday, April 14, 2021 3:25PM**

**Via Zoom:**

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