



The Department of Chemical Engineering
Presents:

James R. McKone

Department of Chemical Petroleum Engineering
Department
University of Pittsburgh

Electrify Everything Science and Engineering for a Sustainable Chemical Industry

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

Abstract. Our research group uses the principles of electrochemistry and chemical reaction engineering to advance new technologies for sustainable energy and chemical production. This presentation will summarize ongoing work in our lab directed at developing technologies that use renewable electricity to continuously regenerate commodity chemicals from waste products like CO₂. First, I will lay out the enormous challenge of reconfiguring the global chemical industry around the use of renewable resources rather than fossil fuels as well as the central role that hydrogen will play in this transformation. Next, I will focus on the production of hydrogen via water electrolysis and specifically our work to understand the precise, nanoscale composition of earth-abundant catalysts for next-generation water electrolyzers. Finally, I will summarize ongoing efforts to develop catalytic assemblies that use metal oxides to transport hydrogen between two completely different reactive environments, potentially enabling a new type of highly versatile hydrogenation reactor that runs on electricity and seawater.

Bio. Dr. James R. McKone is an assistant professor in the Department of Chemical Petroleum Engineering Department at the University of Pittsburgh. He holds a bachelor's degree in chemistry and music from Saint Olaf College and a PhD in chemistry from the California Institute of Technology. Prior to joining the faculty at Pitt in 2016, he was a DOE EERE postdoctoral researcher in the Department of Chemistry and Chemical Biology at Cornell University. Prof. McKone's research group studies fundamentals and applications of electrochemistry, materials chemistry, and chemical reaction engineering with an eye toward improving environmental sustainability in the energy and chemical sectors. In 2013, he was the recipient of the Milton and Francis Clauser Prize for exemplary doctoral research, and in 2017 he was named a Scialog faculty fellow in advance energy storage by the Research Corporation for Science Advancement. In 2019 he received the Ralph E. Powe Junior Faculty Enhancement Award from Oak Ridge Associated Universities and his research was featured in the "Emerging Investigators" special issue of the *Journal of Materials Chemistry A*. In 2020 McKone was named a Beckman Young Investigator by the Arnold and Mabel Beckman Foundation.

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