Shannon Stahl Is the Winner of the 2020 ACS Catalysis Lectureship

Since 2011−2012, ACS Catalysis has cosponsored a Lectureship with the ACS Division of Catalysis Science and Technology honoring outstanding research in catalysis. The Lectureship is awarded each year to an individual or team whose research enables significant advances in the field of catalysis, with a particular emphasis on achievements during the seven-year period prior to the year of the nomination. In 2018, this Lectureship began targeting research in distinct subfields in catalysis, focusing on biocatalysis and enzymology in 2018, with Nicholas Turner (University of Manchester) being honored, and then heterogeneous catalysis in 2019, when Charles Sykes and Maria Flytzani-Stephanopoulos (Tufts University) were recognized. This year, with a focus on homogeneous catalysis, we are pleased to announce that Shannon Stahl of the University of Wisconsin-Madison will deliver the 2020 ACS Catalysis Lectureship.

Prof. Stahl was selected from an incredibly strong pool of candidates for his groundbreaking work in the development of catalytic methods for the controlled oxidation of organic compounds. His work is characterized by a strong emphasis on the development of practical synthetic methods driven by in-depth mechanistic understanding. His contributions to catalysis recognized by this award include developing the copper-catalyzed oxidation of key functional groups including alcohols, amines, and hydrocarbons. His work developing systems that employ oxygen as a terminal oxidant with both Cu and Pd as catalysts has illustrated how careful mechanistic analysis, coupled with insightful catalyst development, can result in ground-breaking synthetic methods. Recent work from the Stahl group has included the development of Cu-catalyzed oxidation chemistry employing nitroxyl radicals as intermediate oxidants. Although Cu-catalyzed methods are notoriously difficult to study, Stahl and co-workers performed detailed studies of these processes and were able to rule out the commonly accepted mechanism and propose a viable alternative. These insights led to major catalyst improvements and eventually to one of the most sought-after reactions in catalysis: the ability to catalyze amide bond formation with O2 as the only reagent and water as the only byproduct.

The uptake of Stahl’s methods in industry highlights their relevance. Oxidations of alcohols, again with O2 as the reagent and water as the only byproduct, have been published collaboratively with academic and industry partners, illustrating the importance of Stahl’s oxidation catalysis. Industrial process chemistry teams have described scale-up and handling of Stahl’s nitroxyl radical species, and together with key academic and industrial researchers, Stahl has published a practical guide to the use of oxygen as a terminal oxidant.

In recent work, the Stahl group has employed these principles in electrochemically driven oxidations, highlighting the importance of controlling overpotential and the choice of organic or inorganic mediator. The insights from the team’s research on electrochemical and oxidase processes are now being used by his group in the critically important task of valorizing biopolymers such as lignin.

Stahl’s contributions to chemistry and catalysis will be celebrated at an upcoming session at the ACS National Meeting in San Francisco, CA, in August of this year. Participants will undoubtedly highlight the many contributions of his research team to synthetic and mechanistic catalytic chemistry, meaning it will be an event that should not be missed. We look forward to seeing you there, so we can celebrate the achievements of Shannon and his team.

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Notes
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