

Transitioning Bioelectrocatalysis from Sensors to Energy Conversion and Electrification of the Chemical Industry

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Abstract: Bioelectrocatalysis is the field of utilizing biocatalysts (i.e. enzymes, microbes, organelles, etc.) as electrocatalysts. The field has been popular over the last 20+ years, because bioelectrocatalysis is the mechanism for commercial glucose biosensors for testing blood glucose in diabetic patients. However, this talk will discuss the translation of enzymatic bioelectrocatalysis from biosensors and analytical chemistry to energy conversion and electrosynthesis. The talk will discuss utilizing enzyme cascades for deep oxidation of fuels in fuel cells, as well as the use of the selectivity of enzymes for efficient organic electrosynthesis with a focus on improving the sustainability of the chemical industry through electrification.

Short bio: Shelley Minteer is the Dr. Ken Robertson Memorial Endowed Professor of Chemistry and the Director of the Kummer Institute Center for Resource Sustainability at Missouri University of Science and Technology. She is also the Director of the NSF Center for Synthetic Organic Electrochemistry. She received her PhD in Analytical Chemistry at the University of Iowa in 2000 under the direction of Professor Johna Leddy. After receiving her PhD, she spent 11 years as a faculty in the Department of Chemistry at Saint Louis University before moving to the University of Utah in 2011 to lead the USTAR Alternative Energy Cluster. She moved to Missouri S&T in 2023 to found the Kummer Institute Center for Resource Sustainability. She was a Technical Editor for the Journal of the Electrochemical Society (2013-2016) and also an Associate Editor for the Journal of the American Chemical Society (2016-2020) before becoming the inaugural Editor-in-Chief of the ACS Au Journals. She has published greater than 500 publications and greater than 650 presentations at national and international conferences and universities. She has won several awards including the Luigi Galvani Prize of the Bioelectrochemical Society, International Society of Electrochemistry Tajima Prize and Bioelectrochemistry Prize, Grahame Award of the Electrochemical Society, Fellow of the Electrochemical Society and the International Society of Electrochemistry, American Chemical Society Division of Analytical Chemistry Award in Electrochemistry, and the Society of Electroanalytical Chemists' Young Investigator Award and Reilley Award. Her research interests are focused on electrocatalysis and bioanalytical electrochemistry. She has expertise in biosensors, biofuel cells, electrosynthesis, and bioelectronics.