Microbial Electrochemical Platform for Energy and Water Sustainability

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Abstract: Water and energy systems are interlinked and interdependent. Water management accounts for 8-10% of oil/gas operational cost, and this number is 10-15% for biorefineries. While water and wastewater treatment consume 3-5% of the total energy produced in the US, recent studies reveal that new technologies can potentially transform wastewater treatment and desalination to energy-neutral or even energy-positive. Furthermore, value-added chemicals, biofuels, and other resources can be produced, leading a path to circular economy. This presentation introduces a microbial electrochemical technology (MET) platform that was recently developed to recover energy and chemicals from biomass and wastewater, and it highlights the potential of this approach in renewable energy research. MET provides a flexible platform for both oxidation and reduction oriented processes, and it tightly relates to research in material science, microbiology, biochemistry, and engineering. Several projects will be discussed in using this integrated biological and electrochemical approach for energy and environmental applications, including energy and chemical production, carbon capture and utilization, waste treatment, water desalination, and soil remediation.

Bio: Jason is an associate professor at CU Boulder and a visiting professor at National Renewable Energy Lab. His research focuses on energy and resource recovery, anaerobic treatment systems, and electrochemistry. His group has received more than 5 million dollars in funding support, published more than 80 journal articles, filed 4 patent disclosures, and founded two start-up companies. He teaches environmental microbiology and energy and resource recovery at CU. Before joining CU, he received his Ph.D from Penn State University. More information about his group can be found at https://sites.google.com/a/colorado.edu/ren/

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