

Biofilm Engineering Approaches for Improving the Performance of Bioelectrochemical Systems

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Abstract

Bioelectrochemical systems have been realized as promising candidates for a wide range of applications such as bioremediation, powering implantable devices, electrosynthesis of value added products, and biosensing in the deep and extreme environments. Electron transfer from the microorganisms to the electrodes remains a major bottleneck for taking up these technologies in practical applications. Good selection of electrode materials and engineering the surface architecture of electrodes will aid in improved biofilm formation and electrocatalysis. The presentation will address biofilm engineering strategies for improved bioelectrocatalysis by tailoring the surface architecture of electrodes using biopolymers, nanomaterials, and conducting polymers. Functionalization strategies will increase biocompatibility for improved biofilm engineering and will increase conductivity of electrodes for improved electron transfer characteristics at electrode-electrolyte interfaces.

Keywords: Microbial Electrocatalysis, Biofilm engineering, Bioelectricity, Electroactive microorganisms



Biography: Dr. Navanietha Krishnaraj is a Research Scientist in the Department of Chemical and Biological Engineering, South Dakota School of Mines and Technology, Rapid City, SD. His research activities are focused on bioelectrochemical engineering and computational biology. Recently, he received Young Faculty Award in Chemical Engineering for his outstanding accomplishments in teaching and research. In 2016, he received prestigious Bioenergy-Award for Cutting Edge Research for his work on Microbial Electrolysis. In 2017, he received the Australian Overseas Award for his project on developing a novel Bio-electrochemical module for Biodiesel Production. He has been PI/Co-I for 4 research grants supported by National and

International agencies. He is the active member of several professional societies such as Society for Industrial Microbiology and Biotechnology (USA), American Society for Microbiology, and American Society for Gravitational and Space Research. He is a panelist for reviewing research grants for federal agencies such as NASA. He is currently serving as an Editor for books on Bio-electrochemical Interface Technologies (Wiley), Biofilm engineering (American Chemical Society) and Biovalorisation of Wastes to Renewable Chemicals (Elsevier). He is an Associate editor for IEEE Access (Impact factor: 3.55), Guest Editor for Bioresource Technology (Impact factor: 5.808), and editorial board member for few reputed journals.

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