

Plugging Electrogenic Bacteria and Building a Solar-Driven Microbial Photoelectrochemical Cell

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Abstract:

Microbial fuel cells (MFCs) are fed by the catalytic reaction of electrogenic bacteria that converts biodegradable material and wastewater to electrical current. A major drawback to their adoption and utilization in large scale is that MFCs suffer from low current density. Understanding and optimizing the interaction between electrogenic bacteria and the solid electrode is the key step to transform MFCs into a robust and scalable technology. Our work aims to 1 understand this interaction. 2 enhance the electron transfer efficiency by directly wiring the electro active outer membrane proteins to the solid electrode. 3 By combining outputs from aim 1 and 2, we can enhance the conductivity of the bacterial biofilm. 4 Finally, as a proof of principle, we will build a solar-driven microbial photo electrochemical cell. The proposed project will enhance our fundamental understanding of the bioanode in microbial fuel cells and would lead to a more efficient clean energy source.