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From carbon dioxide to organic compounds: Novel cathode materials for microbial electrosynthesis MENGMENG CUI, TIAN ZHANG, HUARONG NIE, HAIYUN LU, DEREK LOVLEY, THOMAS RUSSELL, University of Massachusetts-Amherst — Electrode materials play an important role in the production of organic compound during microbial electrosynthesis, which uses bacteria as a catalysts to reduce carbon dioxide to organic compounds and stores electric energy in carbon-carbon bonds. An ideal electrode generally has high surface area, high electric conductivity, physical and chemical stability, and biocompatibility with bacteria. Based on these criteria, three types of materials were considered for the electrode design: CNTs, metal, and conductive polymers. Through a combination of these three materials, different properties were incorporated onto the electrodes for microbial electrosynthesis. The morphologies of the electrodes were characterized by high resolution TEM, SEM, and laser scanning confocal microscopy. The productivity of organic compounds was also verified.

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