Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Microwave energy application on carbon cathode for high efficient microbial electrosynthesis HUARONG NIE, MENGMENG CUI, Department of Polymer Science & Engineering, University of Massachusetts, Amherst, TIAN ZHANG, DEREK LOVLEY, Department of Microbiology, University of Massachusetts, Amherst, THOMAS RUSSELL, Department of Polymer Science & Engineering, University of Massachusetts, Amherst — Microbial electrosynthesis represents a promising strategy of energy storage through microbial conversion of carbon dioxide to transportation fuels or other organic commodities. One key feature for its commercialization is to enhance the cathode performance associated with microbial inoculums. A biocompatible, high surface area, multi-level porous cathode was developed from microwave pyrolysis of ferrocene on carbon felt to support the microorganism to produce acetate from carbon dioxide. The formed nanostructure flake composite on fibers increased the biofilm-cathode interfacial surface area, the interaction between the cathode surface and the microbial biofilm and the electractivity of cathode, while the macroscale porous structure of the intertwined carbon fibers provides easy microbe access. Around 743 mM cm^{-2} d^{-1} of acetate was generated by Sporomusa, which is 3.2 fold larger than the reported highest value coming from the chitosan coated carbon cloth cathode.

Huarong Nie
Department of Polymer Science & Engineering,
University of Massachusetts, Amherst

Date submitted: 13 Nov 2012 Electronic form version 1.4