Acetate production from CO2 bioelectrosynthesis using modified graphite felt with polyaniline (PANI@GF)

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Microbial electrosynthesis (MES) based on CO_2 conversion and utilization have recently been spotlighted as an innovative technology for the production of high value-added chemicals (i.e. acetate). Electron uptake of microorganism through extracellular electron transport system and cathode is a key step in the acetate production from CO_2 of microbial electrosynthesis. Here, we developed a novel electrodeposited graphite felt electrode using polyaniline (PANI@GF). The high biocompatibility and good electro-conductivity of PANI increased the specific surface area and interfacial interaction between the cathode surface and the microbe, thus facilitate a biofilm formation. The electrochemical properties of PANI@GF were analyzed through cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). And the physicochemical properties of PANI@GF are analyzed by scanning electron microscope (SEM), FT-IR (Fourier Transform Infrared Spectrometry). The PANI@GF produced much higher acetate production than the untreated GF (control). The results show that PANI@GF electrodes improve the microbes-electrode interaction and extracellular electron transfer and performance of MES.