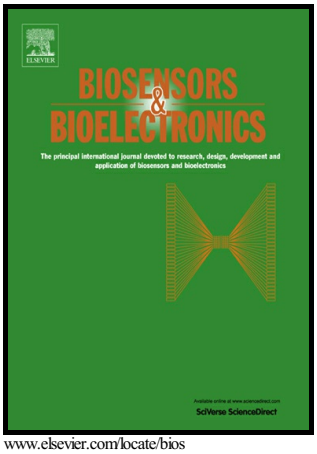

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Binder-free graphene and manganese oxide coated carbon felt anode for high-performance microbial fuel cell

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Abstract

A novel anode was developed by coating reduced graphene oxide (rGO) and manganese oxide (MnO_2) composite on the carbon felt (CF) surface. With a large surface area and excellent electrical conductivity, this binder-free anode was found to effectively enhance the enrichment and growth of electrochemically active bacteria and facilitate the extracellular electron transfer from the bacteria to the anode. A microbial fuel cell (MFC) equipped with the rGO/MnO_2/CF anode delivered a maximum power density of 2065 mW m^{-2}, 154% higher than that with a bare CF anode. The internal resistance of the MFC with this novel anode was 79 Ω, 66% lower than the regular one's (234 Ω). Cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) analyses affirmed that the rGO/MnO_2 composite significantly increased the anodic reaction rates and facilitated the electron transfer