

The Improved Biofuel Cell for Electrical Power Generation from Wastewaters

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Abstract : Newly synthesized Polypropylene-g-Polyethylene glycol polymer was first time used for a compartment-less enzymatic fuel cell. Working electrodes based on Polypropylene-g-Polyethylene glycol were operated as unmediated and mediated system (with ferrocene and gold/cobalt oxide nanoparticles). Glucose oxidase and bilirubin oxidase was selected as anodic and cathodic enzyme, respectively. Glucose was used as fuel in a single-compartment and membrane-less cell. Maximum power density was obtained as 0.65 nW cm⁻², 65 nW cm⁻², and 23500 nW cm⁻² from the unmediated, ferrocene and gold/cobalt oxide modified polymeric film, respectively. Power density was calculated to be ~16000 nW cm⁻² for undiluted wastewater sample with gold/cobalt oxide nanoparticles including system.

Keywords : bilirubin oxidase, enzymatic fuel cell, glucose oxidase, nanoparticles

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