

عنوان مقاله:

A comparative study of three types of anode electrodes in a microfluidic microbial fuel cell

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خلاصه مقاله:

Microbial fuel cells (MFCs) are innovative bioelectrochemical approaches for the natural conversion of organic resources into energy based on the metabolic activities of inoculated bacteria that serve as biocatalysts. The main objective of the present study was to examine the effect of zinc foil modified with zinc oxide as a novel anode material to enhance power generation in a microfluidic MFC using oxalate as a substrate. X-ray diffraction and FE-SEM analyses were done for nanostructure confirmation and to understand the morphology of a zinc oxide-coated electrode. The microfluidic MFC performance was investigated and compared with a zinc foil and zinc foil linked stainless steel mesh through an external circuit. The experimental results expressed that the zinc foil, zinc foil externally linked stainless steel, and modified zinc foil as anode electrodes achieved the maximum power density of 2980 W m^{-3} , 1080 W m^{-3} , and 428 W m^{-3} , respectively. The results demonstrated that the zinc oxide nanorods could not act as an effective avenue for improving the microfluidic MFC performance.

کلمات کلیدی:

microfluidic microbial fuel cell, anode, nanomaterial, oxalate, *Shewanella oneidensis* MR-1

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