Electricity generation in a baffled microbial fuel cell without membrane using Geobacter Sulfurreducen ATCC 51573

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Microbial fuel cells (MFC) using bacteria as a biocatalyst ca convert cheap organic matter into electricity. Most of MFCs are consisting of an anode, a cathode, and proton exchange membrane (PEM). Especially, a PEM plays a important role of transporting protons into cathodic chamber and protecting oxygen diffusion from cathodic chamber to anodic chamber, but its high cost can be a barrier for scaling-up MFCs that produce low electricity production, unlike a chemical fuel cells. Recently, to develop a cost-effective system, new technologies have been focusing on eliminating a PEM, which has led to low electricity production caused by diffusion of oxygen from a cathodic chamber. In this study, we developed a baffle fuel cell system without a membrane in which proton was transported using hydraulic flow and buffer solution as an electrolyte and oxygen diffusion between two chambers was protected with internal baffles. In order to estimate the performance of this system, two type of MFCs with and without a PEM were tested by continuously feeding acetate as a fuel for the operation period of more than a month and their productivity were compared on the basis of equally sized anodes, cathodes.