

Improvement of biocompatibility by surface modification of three-dimensional porous graphite granule electrode for a microbial fuel cell

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Microbial fuel cell (MFC) converts chemical energy stored into biodegradable organics into electricity through microbial respiration. MFC has been extensively examined for bioenergy production and simultaneous removal of various contaminants. The interaction between microbe and surface of carbon electrode plays an important role to capture respiratory electron from bacteria, and produce bioelectricity in MFC. Hence the improvement of electrochemical properties of carbon material is essential to enhance the performance. In this study, we modified surface structure of graphite granule and examined its performance in MFC. The improvement of the specific surface area and the distribution of micropore and mesopore facilitate bacterial attachment on the carbon surface. The enhancement of electron transfer rate and power output was examined with the surface modification in various operating conditions. This result implicates that the surface modification increase the performance of electrode-based bioprocess such as MFC and bioelectrochemical systems.