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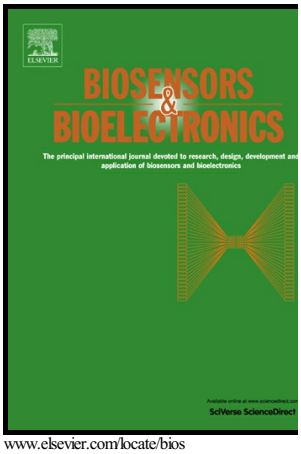

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Recoverable Hybrid Enzymatic Biofuel Cell with Molecular Oxygen-independence

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Abstract

Enzymatic biofuel cells (EBFCs) have drawn great attentions because of its potential in energy conversion. However, designing of highly efficient EBFCs which can adapt to the anaerobic system is still a great challenge. In this study, we propose a novel hybrid enzymatic biofuel cell (HEBFC) which was fabricated by a glucose dehydrogenase modified bioanode and a solid-state silver oxide/silver (Ag_2O/Ag) cathode. The as-assembled HEBFC exhibited an open circuit potential of 0.59 V and a maximum power output of 0.281 mW cm^{-2} at 0.34 V in air saturated buffer. Especially, due to the introduction of Ag_2O/Ag, our HEBFC could also operate under anaerobic condition, while the maximum power output would reach to 0.275 mW cm^{-2} at 0.34 V. Furthermore, our HEBFC had stable cycle operation and could keep high power output for a certain time as the result of the regeneration of Ag_2O. Our work provides a new concept to develop EBFCs for efficient energy conversion in the future.