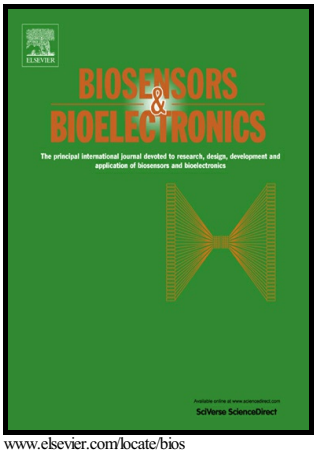

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Abstract

Currently, the development of less expensive, more active and more stable catalysts like heteroatom-doped carbon based non-precious metal materials are highly desired for the cathodic oxygen reduction reaction (ORR) in microbial fuel cells (MFCs). Comparing with heteroatom sources from chemical reagents, biomass is notably inexpensive and abundant, containing more elements which contribute to ORR