
Biosensors based on lithotrophic microbial fuel cells: research progress, challenges and opportunities

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Abstract

Biosensors based on the microbial fuel cell (MFC) platform have been receiving increasing attentions from researchers owing to their unique properties. The lithotrophic MFC, operated with a neutraphilic iron-oxidizing bacterial community, has recently been developed and proposed to be used as a biosensor to detect iron, and probably metals in general, in water samples. The lithotrophic MFC-based biosensor shares common properties with the organotrophic counterpart, in terms of configuration, fabrication, microbiology, electron transfer mechanism and sensing performance, etc. but also has distinctive features. Currently, the challenges for the realization of the practical application of the device involve the selection of inoculation sources, performance stability and limited detection range. However, the device still offers several promising application potentials in the context of metal monitoring and bioremediation.

Keywords: microbial fuel cell, bioelectrochemical systems, iron bacteria, iron oxidation, lithotrophic biosensor

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