Behavior of Copper, Nickel, Cadmium and Mercury Ions in Anode Chamber of Microbial Fuel Cells

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Microbial fuel cell (MFC) technology is widely used in wastewater treatment, and heavy metal ions play a important role in MFCs. In this paper, we studied the effect of heavy metal ions (copper, nickel, cadmium and mercury) on anode, mainly in voltage output and the recovery after feeding with high concentration of those heavy metal ions. It was concluded that anolyte containing low concentration of Cu^{2+} and Ni^{2+} can improved the performance of MFCs, but when the concentration become higher, the voltage outputs decreased, the minimum toxic concentration of Cu^{2+} is 303 $\mu\text{mol/L}$ and Ni^{2+} 's is 600 $\mu\text{mol/L}$. As for Cd^{2+} and Hg^{2+} , the voltage outputs decreased once these ions added into the MFCs. After replaced the anodic solution with a refresh solution that containing no heavy metal ions, the MFCs would recover in several hours (Cu^{2+} , Ni^{2+} and Cd^{2+} in 24 h, Hg^{2+} in 30 min).

Keywords: Microbial fuel cells; Voltage output; Anode; Metal ions

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