Self-assembly of Amino-Functionalized MOF as Highly Dispersed Cathode Catalyst for Microbial Fuel Cells

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The uniform dispersion of the catalyst is a key factor for the preparation of high-performance microbial fuel cell (MFC) cathodes. Herein, we self-assemble the amino ligand onto the surface of the carbon cloth (CC) by a one-pot method and complex the copper ions to form an amino-functionalized copper metal-organic framework (Cu-MOF-NH₂) as a cathode catalyst for the MFC. The positive charge and polarity of the amino group improve the interaction between the Cu-MOF-NH₂ and the carbon-based electrode, achieving high dispersion and high catalytic activity of the Cu-MOF-NH₂. The application results show that the Cu-MOF-NH₂ modified cathode provides a maximum power density of 0.64 Wm⁻² for the MFC, which is 3.2 times higher than that of the CC base cathode. This work has explored a facile preparation method for a highly dispersed non-precious metal catalyst applied to a cathode, which has certain guiding significance for the large-scale popularization and application of MFCs.

Keywords: Cu-MOF-NH₂, Air cathode, MFC, Self-assembling, ORR

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