Preparation and Bacterial Adsorption Behaviors of Zeolite-Modified Anode in Microbial Fuel Cells

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A zeolite-modified graphite anode was prepared by an in-situ hydrothermal method combined with acid pretreatment, and it showed higher output voltage in dual-chamber microbial fuel cells (MFCs) than the bare graphite felt anode (630.4 vs. 524.6 mV). The anode was modified with different types of zeolite by changing the zeolite synthesis conditions, which was characterized by XRD and SEM to examine the type of modified zeolite on anode, and the modification with NaX zeolite outperformed NaA zeolite. Dispersion of more zeolite on the graphite felt was also an important effect to improve the MFC performance. After examining the effect of zeolite on bacterial adsorption was examined, it was found that the wetting and glucose adsorption abilities of the anode were greatly improved by zeolite modification and enabled the anode to attach more bacterial cells. Large amount of agglomerated crystals cannot provide suitable environment for microbial growth, so the zeolite should be dispersed.

Keywords: Zeolite; Microbial fuel cells; Anode modification; bacterial adsorption

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