

Effect of Heteropolyacid and Heteropolyacid Salt on the Performance of Nanometer Proton Membrane Microbial Fuel Cell

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To improve the performance of microbial fuel cells, membrane modification of microbial fuel cell with heteropolyacid and heteropolyacid salt is studied. Using lake water and molasses wastewater as the anode substrate and the mixed solution of $K_3[Fe(CN)_6]$ and NaCl as catholyte, the power generation performance and wastewater treatment effect of microbial fuel cells with common Nafion membrane, heteropolyacid modified Nafion membrane and heteropolyacid salt modified Nafion membrane were studied. The experimental results show that the membranes modified by heteropolyacid and heteropolyacid salt have a better water retention capacity than common Nafion membrane, and the microbial fuel cell with modified proton exchange membrane by heteropolyacid salt has better power generation performance and better sewage treatment effect, in addition, the power generating capacity of molasses wastewater is much higher than that of lake water. The water absorption rate of the heteropolyacid nano membrane is 11.59%, and the water absorption rate of heteropolyacid salt nano membrane is 23.26%. The generating ability and the purifying effect of the microbial fuel cell with molasses wastewater as the anode substrate and heteropolyacid salt Nafion membrane as the proton exchange membrane reached the best state, in which the output voltage is 0.0356V and the removal rate of COD is 53.1%.

Keywords: microbial fuel cell; nanometer proton membrane; heteropolyacid; heteropolyacid salt

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