



Influence of surface properties of PVDF/MWNT_{HPAE} nanocomposite membrane on the antibiofouling performance

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ABSTRACT

The incorporation of carbon nanotubes into membranes has attracted a great deal of attention due to their strong antibiofouling property. Hyperbranched poly(amine-ester) functionalized multiwalled carbon nanotubes (MWNT_{HPAE}) were prepared to develop poly(vinylidene fluoride) (PVDF)/MWNT_{HPAE} nanocomposite membranes in our previous work. The prepared nanocomposite membranes had higher water transport and less protein adsorption than PVDF membrane. In this paper, we further investigated the effects of surface properties of PVDF/MWNT_{HPAE} nanocomposite membranes (hydrophilicity, surface charge and roughness) on their antimicrobial performance under no filtration condition. Antibacterial activity test indicated that no inactivation of model bacteria (*Escherichia coli* K12) was observed. The bacterial cells attached on the surface of the PVDF/MWNT_{HPAE} nanocomposite membrane were less than that of the PVDF membrane. The number of attached bacterial cells decreased with the increasing concentration of MWNT_{HPAE}. The results demonstrated that incorporation of MWNT_{HPAE} could enhance the antibiofouling performance of PVDF membrane.

Keywords: Poly(vinylidene fluoride); Multiwalled carbon nanotubes; Hydrophilicity; Hyperbranched poly(amine-ester); Antibiofouling

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