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Zhixiao Liu, Zhiming Mi, Sizhuo Jin, Chunbo Wang, Daming Wang*, Xiaogang Zhao, Hongwei Zhou, Chunhai Chen

National & Local Joint Engineering Laboratory for Synthesis Technology of High Performance Polymer, Key Laboratory of High Performance Plastics, Ministry of Education, College of Chemistry, Jilin University, Changchun 130012, People's Republic of China

*Correspondence to: wangdaming@jlu.edu.cn

Abstract

Sulfonated hyperbranched polyethersulfone (SHBPES)-modified halloysite nanotubes (HNTs), HNT-SHBPES, were synthesized and mixed with polyethersulfone (PES) to prepare hybrid ultrafiltration (UF) membranes *via* the phase inversion method. Pure PES and PES hybrid membranes mixed with SHBPES and HNTs were also prepared. The HNT-SHBPES showed good compatibility with the PES membrane matrix, and a series of PES/HNT-SHBPES hybrid membranes offered improved porosity, surface mean pore size, hydrophilicity, permeability, and anti-fouling properties. These were mainly attributed to the synergistic effects of hydrophilic $-SO_3H$ of SHBPES, porous HNTs, and the tiny interspace between HNT-SHBPES and PES matrix. When 8% HNT-SHBPES was doped into PES casting solution (MHS-8), its pure water flux reached $351.6 \text{ L/m}^2 \text{ h}$ —this was nearly 2.2 times that of the pure PES membrane (M-0); its rejection rate remained high primarily due to the occurrence of delayed phase separation in the solidification process and the good compatibility between HNT-

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