Fabrication and properties of recycled poly (vinylidene fluoride) (PVDF) hollow fiber membranes

Xinya Wang, Changfa Xiao*, Hailiang Liu, Qinglin Huang, Mingxing Chen

State Key Laboratory of Separation Membranes and Membrane Processes, Tianjin Polytechnic University, No. 399, Binshui Road, Xiqing District, Tianjin, 300387, China, Tel. +86 022 83955934, email: 1427107637@qq.com (X. Wang), Tel. +86 022 83955299, email: xiaochangfr@163.com (C. Xiao), Tel. +86 022 83955393, liuhailiang723@163.com (H. Liu), Tel. +86 022 83955795, email: huangqinglin@tjpu.edu.cn (Q. Huang), Tel. +86 022 83955781, email: 838144595@qq.com (M. Chen)

Received 16 March 2017; Accepted 3 August 2017

ABSTRACT

The structure and performance of waste PVDF hollow fiber membranes were investigated by shear viscosity and melt flow index (MFI) and the effect of running time on the properties of waste PVDF hollow fiber membranes was discussed. In addition, the recycled PVDF hollow fiber membranes were fabricated via dry-wet spinning method. The obtained results showed that the PVDF molecular weight decreased with the increase of the running time. The decrease of PVDF molecular weight also led recycled PVDF hollow fiber membranes to have higher porosity and better permeability. However, the mechanical properties and BSA rejection were lower. Moreover, the wettability of recycled PVDF hollow fiber membranes was similar to original PVDF hollow fiber membrane which was prepared from PVDF powder.

Keywords: Waste PVDF hollow fiber membrane; Molecular weight; Recycled PVDF hollow fiber membrane; Structure and performance

*Corresponding author.