

Effect of PVDF-CA ratio on electrospun membrane fabrication for water filtration application

Alias, Mohamad Haziq, Hassin, Noor Syafiqah, Pui, Lau Pui, Misnon, Izan Izwan, Jose Rajan

Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, Malaysia

Abstract:

Innovation in water filtration media leads to tremendous focus in academia due to fresh water source declining and contamination. Electrospinning is considered as new and effective protocols in synthesizing filtration membrane for this purpose. Electrospun membrane of PVDF and CA composite at different ratios has been fabricated for water filtration application. The membranes were characterized using TGA, FTIR, viscometer, conductivity testing, contact angle and FESEM. TGA result showed a shifting in thermal stability with respect to the increasing PVDF ratio (90P10C). FTIR analysis showing five membrane samples had the same functional groups included C-F, =C-H, C-O, C=O, C-H and O-H groups. The FESEM showed a nanofiber with an average diameter of 0.43324 μm and possess the average pore size of 0.3068 μm . Contact angle of the membrane is increased by the PVDF increment (130° @ 10:90 ratio). The filtration analysis of lake water demonstrates the best performing membrane 90P10C give 84.9% rejection at a high flux (26,253 L m⁻² h⁻¹), low turbidity (0.38 NTU) and comply to Malaysia Water Standard Type 1.

Keywords: Cellulose acetate, Electrospinning, Filtration, Membrane, Nanofiber

Acknowledgement

This work was supported by Universiti Malaysia Pahang Internal Fund (RDU1803117) author (N.S. Hassin) would like to thank UMP PRGS (PGRS190353) for financial support.