

physicochemical properties of PSF/NH₂-SiO₂ composite membranes incorporated by polymeric additives

This research project aims to study the effects of PVP and PEG on the morphological structure, hydrophilicity and mechanical properties of PSF/NH₂-SiO₂ nanoporous composite membranes. To investigate the physical and chemical properties as mentioned above, pure PSF and composite of PSF/NH₂-SiO₂ membranes with and without the addition of PVP and PEG are fabricated by phase inversion method. Alteration of characteristics of synthesized membrane samples are evaluated by different analytical techniques. Hydrophilicity of membrane surfaces is analyzed through the measurement of water contact angle (WCA) while morphological structure and pore size as well as physical structure are evaluated through the SEM micrographs. Variation of hydrophilic functional group is analyzed by FTIR technique. Results showed that PVP and PEG clearly affect to morphological and porous structures of composite membranes. Porous structure have changed from sponge-like structure with macrovoids to finger-like structure. Macrovoids disappeared when PVP and PEG were incorporated into the matrix of PSF/NH₂-SiO₂ composite membranes. Importantly, nano-size pore appeared on the top surface of PSF/NH₂-SiO₂ membranes incorporated with PVP and PEG. Moreover, PVP and PEG also influenced to hydrophilic properties of membrane samples. This effect is confirmed by increasing of hydrophilic group on the composite membrane surfaces and decreasing of WCA.

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