

ABSTRAK

Penelitian ini bertujuan untuk mensistesis dan mengkarakterisasi membran filtrasi berbasis komposit Kitosan - Polivinil Alkohol (PVA) - Polietilen Glikol (PEG) – *Multiwall Carbon Nanotube* (MWCNT). Pembuatan membran kitosan-PVA-PEG-MWCNT dilakukan melalui metode *mixing solution*. Karakterisasi membran dilakukan menggunakan instrumentasi FTIR, SEM dan *tensile strength*. Penentuan komposisi optimum komponen penyusun membran ditentukan melalui pengukuran fluks. Hasil penelitian menunjukkan bahwa komposisi optimum membran komposit kitosan:PVA:PEG:MWCNT adalah 6:2:5:3 secara berturut-turut. Foto SEM menunjukkan bahwa membran komposit merupakan material berpori dengan ukuran pori asimetris dan distribusi pori heterogen. Penambahan MWCNT memperbesar ukuran pori membran. Spektra FTIR menunjukkan adanya interaksi antara kitosan-PVA-PEG-MWCNT yang secara dominan berlangsung melalui ikatan hidrogen antar molekul yang ditandai dengan adanya pergeseran dan perubahan intensitas pada puncak serapan untuk *stretching* gugus fungsi OH/ NH juga *bending* gugus C-O. Hasil pengukuran *tensile strength* menunjukkan peningkatan gaya tarik maksimum yang mengindikasikan peningkatan kekuatan sifat mekanik membran kitosan-PVA-PEG-MWCNT. Penambahan MWCNT pada kitosan-PVA-PEG meningkatkan fluks 58,89 L/jam.m² dari 38,07 L/jam.m². Dapat dinyatakan bahwa membran filtrasi kitosan-PVA-PEG-MWCNT berpotensi untuk diaplikasikan sebagai material dalam pengolahan air berbasis filtrasi. Namun, studi lebih lanjut pada kinerja membran masih perlu dilakukan.

Kata Kunci : Membran Filtrasi, MWCNT, Kitosan, PVA, PEG

ABSTRACT

This research aims to synthesize and characterize membrane filtration based on composite Chitosan- Poly vinyl Alcohol (PVA) – Polyethylene Glycol (PEG) – Multiwall Carbon Nanotubes (MWCNT) made by mixing solution method. Characterize the composite were performed by used FTIR, SEM and tensile strength instrumentation. The optimum composition of membrane precursor was determine through measurement of flux (permeability). The result showed was optimum composition of composite Chitosan-PVA-PEG-MWCNT was 6:2:5:3. The SEM images demonstrated that the synthesized membrane has asymmetrical porous structure with heterogeneous pore size and distribution. The insertion of MWCNT into membrane matrices significantly enhanced membrane pore size. The FTIR spectra indicated the interaction between Chitosan-PVA-PEG-MWCNT which predominantly took place through intermolecular hydrogen bonding as proved by the shifting which dominantly occurred by hydrogen bonding between molecule, peak position and intensity of several functional groups –OH/ -NH (stretching) and –C=O (bending). The insertion of MWCNT was remarkable increased not only in the mechanical strength of membranes but also in flux from 38,07 L/jam.m² to 58,89 L/jam.m². These result inferred that Chitosan-PVA-PEG-MWCNT based filtration membrane exhibits potential application in water treatment process. However, further study on membrane's performance is still necessary to be improved.

Key Words: Membrane Filtration, MWCNT, Chitosan, PVA, PEG