

ABSTRAK

SINTESIS DAN KARAKTERISASI PENGARUH VARIASI BERAT SiO₂ PADA PEMBUATAN MEMBRAN NANOFIBER PVA/SiO₂ MENGUNAKAN METODE *ELECTROSPINNING*

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Telah dibuat membran *nanofiber* PVA/SiO₂ dengan menggunakan metode *electrospinning*. Penelitian ini bertujuan untuk mensintesis membran *nanofiber* PVA/SiO₂ dengan variasi berat SiO₂ dan mengetahui pengaruh variasi penambahan SiO₂ pada PVA dari membran *nanofiber* PVA/SiO₂ terhadap porositas, gugus fungsi dan morfologi. Variasi SiO₂ yang digunakan adalah 0, 2, 3, 5 wt%. Proses *electrospinning* dilakukan pada tegangan 20 kV dengan laju alir 2,5 ml/jam. Kemudian membran *nanofiber* yang terbentuk dimasukkan ke dalam oven pada suhu 80°C selama 8 jam. Membran *nanofiber* PVA/SiO₂ diuji porositasnya dan dikarakterisasi menggunakan *Fourier Transformed Infrared* (FTIR), dan *Scanning Electron Microscopy-Energy Dispersive X-Ray* (SEM-EDX). Besar viskositas larutan PVA/SiO₂ dengan variasi SiO₂ yang digunakan 0, 2, 3, 5 wt% masing-masing adalah 0,8; 0,9; 1; 1,4 Pa.s. Besar tegangan permukaan larutan PVA/SiO₂ masing-masing adalah (29 ± 5); (36 ± 5); 39; 39 dyn/cm. Hasil uji porositas membran *nanofiber* PVA/SiO₂ pada sampel PVA/SiO₂-0%, PVA/SiO₂-2%, PVA/SiO₂-3%, PVA/SiO₂-5% masing-masing sebesar 65,7; 74,2; 77,7; 96,5%. Hasil karakterisasi FTIR menunjukkan adanya gugus OH, C-H, CH₂, C-OH, dan Si-OH. Hasil Karakterisasi SEM pada sampel PVA/SiO₂-0%, PVA/SiO₂-2%, PVA/SiO₂-3%, PVA/SiO₂-5% masing-masing adalah (200 ± 43), (262 ± 85), (311 ± 135), dan (381 ± 180) nm. Hasil analisis EDX menunjukkan kehadiran unsur C, O, dan Si.

Kata kunci: *electrospinning*, membran *nanofiber* PVA/SiO₂, variasi SiO₂, PVA.

ABSTRACT

SYNTHESIS AND CHARACTERIZATION OF THE EFFECT OF WEIGHT VARIATION OF SiO₂ IN THE MANUFACTURE OF PVA/SiO₂ NANOFIBER MEMBRANES USING THE ELECTROSPINNING METHOD

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A PVA/SiO₂ nanofiber membrane has been made using the electrospinning method. This study aims to synthesis PVA/SiO₂ nanofiber membranes with variations in SiO₂ weight and determine the effect of variations in the addition of SiO₂ to PVA from PVA/SiO₂ nanofiber membranes on porosity, functional groups and morphology. SiO₂ variation used is 0, 2, 3, 5 wt%. The electrospinning process was carried out at a voltage of 20 kV with a flow rate of 2,5 ml/hour. Then the nanofiber membrane formed was put into the oven at 80°C for 8 hours. PVA/SiO₂ nanofiber membranes were tested for porosity and characterized using Fourier Transformed Infrared (FTIR) and Scanning Electron Microscopy-Energy Dispersive X-Ray (SEM-EDX). The viscosity of the PVA/SiO₂ solution with variations of SiO₂ used 0, 2, 3, 5 wt% were 0,8; 0,9; 1; 1,4 Pa.s. The surface tension of each PVA/SiO₂ solution is (29 ± 5); (36 ± 5); 39; 39 dyn/cm. The results of the PVA/SiO₂ nanofiber membrane porosity test on PVA/SiO₂-0%, PVA/SiO₂-2%, PVA/SiO₂-3%, PVA/SiO₂-5% samples were 65,7; 74,2; 77,7; 96,5%. FTIR characterization results showed the presence of OH, C-H, CH₂, C-OH, and Si-OH groups. SEM characterization results on samples PVA/SiO₂-0%, PVA/SiO₂-2%, PVA/SiO₂-3%, PVA/SiO₂-5% were (200 ± 43), (262 ± 85), (311) ± 135), and (381 ± 180) nm. The results of the EDX analysis indicated the presence of C, O, and Si elements.

Keyword: electrospinning, PVA/SiO₂ nanofiber membrane, variations of SiO₂, PVA.