

ABSTRAK

SINTESIS DAN KARAKTERISASI SERAT NANO KOMPOSIT PVA/SiO₂ DARI SILIKA SEKAM PADI DENGAN METODE *ELECTROSPINNING*

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Telah dibuat serat nano komposit PVA/SiO₂ dengan menggunakan metode *electrospinning*. Penelitian ini bertujuan untuk menyintesis serat nano komposit PVA/SiO₂ dengan variasi berat SiO₂ dan mengetahui pengaruh variasi penambahan SiO₂ pada PVA dari serat nano komposit 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 serat nano yang terbentuk dimasukkan ke dalam oven pada suhu 90°C selama 8 jam.

Serat nano komposit 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 0,9, 1,2, 1,4 dan 1,8 Pa.s. Besar tegangan permukaan larutan PVA/SiO₂ masing-masing adalah 32, 34, 35 dan 37 dyn/cm. Hasil uji porositas serat nano komposit PVA/SiO₂ pada sampel PVA/SiO₂-0%, PVA/SiO₂-2%, PVA/SiO₂-3%, PVA/SiO₂-5% masing-masing sebesar 54,9%, 69,1%, 72,5%, 76,2%. Hasil karakterisasi FTIR menunjukkan adanya gugus -OH, C-H, C-O, C=O, -CH₂, -CH₃, Si-OH, Si-O, dan Si-O-Si. Hasil Karakterisasi SEM pada sampel PVA/SiO₂-0%, PVA/SiO₂-2%, PVA/SiO₂-3%, PVA/SiO₂-5% masing-masing adalah 165, 175, 199 dan 202 nm. Hasil analisis EDX menunjukkan kehadiran unsur C, O, Si dan Na.

Kata kunci: *electrospinning*, komposit, PVA/SiO₂, serat-nano, silika

ABSTRACT

SYNTHESIS AND CHARACTERIZATION OF PVA/SiO₂ COMPOSITE NANOFIBERS FROM RICE HUSK SILICA WITH ELECTROSPINNING METHOD

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PVA/SiO₂ composite nanofiber have been fabricated using the electrospinning method. This study aims to synthesize PVA/SiO₂ composite nanofiber with varying SiO₂ weights and to determine the effect of SiO₂ addition on the porosity, functional groups, and morphology of PVA/SiO₂ composite nanofiber. The SiO₂ variations used were (0, 2, 3, 5) wt%. The electrospinning process was conducted at a voltage of 20 kV with a flow rate of 2,5 ml/h. The formed serat nano were then placed in an oven at 90°C for 8 hours. The porosity of the PVA/SiO₂ composite nanofiber was tested and characterized using Fourier Transformed Infrared (FTIR) and Scanning Electron Microscopy-Energy Dispersive X-Ray (SEM-EDX). The viscosity of the PVA/SiO₂ solutions with SiO₂ variations of (0, 2, 3, 5) wt% were 0,9, 1,2, 1,4 dan 1,8 Pa.s, respectively. The surface tension of the PVA/SiO₂ solutions were 32, 34, 35 and 37 dyn/cm, respectively. The porosity test results of the PVA/SiO₂ composite nanofiber for the PVA/SiO₂-0%, PVA/SiO₂-2%, PVA/SiO₂-3%, and PVA/SiO₂-5% samples were 54,9%, 69,1%, 72,5%, 76,2%, respectively. FTIR characterization results showed the presence of -OH, C-H, C-O, C=O, -CH₂, -CH₃, Si-OH, Si-O, and Si-O-Si groups. SEM characterization results for the PVA/SiO₂-0%, PVA/SiO₂-2%, PVA/SiO₂-3%, and PVA/SiO₂-5% samples were 165, 175, 199 and 202 nm, respectively. EDX analysis results indicated the presence of C, O, Si and Na elements.

Keywords: composite, electrospinning, nanofiber, PVA/SiO₂, silica