

PENGOPTIMALAN KONSENTRASI *NANOFIBER* MEMBRAN KITOSAN/PVA DAN APLIKASINYA SEBAGAI FILTER ASAP ROKOK

Oleh :

Himayatus Shalihah

12/334812/PA/15021

INTISARI

Nanofiber berhasil dibuat dengan campuran kitosan 2% yang dilarutkan dalam 1% asam asetat. Larutan kitosan dicampur dengan larutan PVA 13% menghasilkan membran PVA 13% dengan teknik elektrospinning pada medan listrik 15kV. Penelitian ini berhasil membuktikan bahwa peningkatan konsentrasi kitosan memiliki efek yang signifikan terhadap perubahan morfologi dan konduktivitas fiber. Diameter rata-rata dan persentase porositas berkurang seiring dengan meningkatnya konduktivitas. Diameter rata-rata PVA 13% sebesar $(139,4 \pm 2,9)$ nm dan persentase porositasnya 50,32%. Kondisi optimal campuran kitosan/PVA dihasilkan pada konsentrasi kitosan/PVA 20/80 wt%, dengan diameter rata-rata $(83,1 \pm 2,0)$ nm dan jumlah porositas sebesar 42,21%. Persentase porositas fiber PVA 13% pasca pengujian berubah menjadi 35,85% sementara pada fiber kitosan/PVA 20/80 berubah menjadi 25,32%. Gugus fungsi membran pasca pengujian filter udara menunjukkan terdapat pergeseran lembah gelombang pada $C = O$ dan $-NH_2$ *stretching* pada membran PVA 13% mengindikasikan berkurangnya gugus kimia dalam membran. Penyerapan kimia pada membran kitosan/PVA 20/80 menunjukkan adanya $-NH_2$ *stretching* dan $C = O$ yang merupakan ciri khas kitosan, dimana $-NH_2$ *bending* pada panjang gelombang $1581,62 \text{ cm}^{-1}$ menghilang pasca pengujian akibat pengikatan gugus amida dengan bahan radikal hasil pengujian asap rokok. Morfologi dan diameter fiber dianalisis dengan menggunakan *scanning electron microscopy* (SEM), struktur kimia dikarakterisasi dengan menggunakan *fourier transform infrared spectroscopy* (FTIR), dan pengujian TGA

Kata kunci: elektrospinning, PVA, kitosan, filter asap rokok

OPTIMIZATION OF CHITOSAN/PVA NANOFIBER MEMBRANE CONCENTRATION AND ITS PROSPECT AS SMOKE FILTER

By :

Himayatus Shalihah

12/334812/PA/15021

Nanofiber is successfully produced by dissolving 2% chitosan solution 2% to 1% acetic acid. The chitosan solution mixed with PVA solution produces membrane using electrospinning technique in the electric field of 15kV. Our present research has found that increasing the concentration of chitosan has a significant effect on morphology and conductivity of fiber. The average diameter and percentage of porosity decreased due to the increasing of conductivity. The average diameter of PVA 13% is $(139,4 \pm 2,9)$ nm and the number of porosity is 50,32%. The optimum condition of chitosan/PVA was obtained at 20/80 wt%, with the average of fiber diameters $(83,11 \pm 1,95)$ nm and the number of porosity is 25,32%. Physicochemical properties of chitosan/PVA solution such as conductivity, morphology, and chemical absorption were investigated before and after air filtration. The number of porosity of PVA 13% after air filtration changes to 35,85% and the number of porosity of chitosan/PVA 20/80 changes to 25,32%. Remarkable absorption peaks of PVA 13% exhibits C = O and $-NH_2$ stretching shifted after air filtration test, indicating functional groups reduce. The chemical absorption of chitosan/PVA 20/80 shows $-NH_2$ stretching and C = O functional groups which $-NH_2$ bending at the region $1581,62 \text{ cm}^{-1}$ disappeared after air filtration test. The morphology and diameter of the electrospun fiber were analyzed by using scanning electron microscopy (SEM), the chemical absorption was characterized by fourier transform infrared spectroscopy (FTIR).

Keywords: electrospinning, PVA, chitosan, smoke filter