

## INTISARI

### **KAJIAN PENGARUH KETEBALAN MEMBRAN NANOFIBER POLYACRYLONITRILE (PAN)/KITOSAN SEBAGAI FILTER UDARA**

Oleh :

**Zulfa Hasna Fadhillah**

**17/409406/PA/17713**

Membran *nanofiber Polyacrylonitrile* (PAN) difabrikasi menggunakan metode *electrospinning* untuk aplikasi filter udara. Larutan PAN dibuat dengan konsentrasi 6 wt%, kemudian membran PAN yang telah terbentuk dituangkan dengan kitosan konsentrasi 2 v/v%. Membran PAN/kitosan dengan variasi ketebalan dikarakterisasi menggunakan *Scanning Electron Microscopy* (SEM) dan *Fourier Transform Infrared* (FTIR). Hasil karakterisasi menunjukkan kitosan berpengaruh terhadap morfologi dan gugus fungsi membran *nanofiber* PAN. Membran *nanofiber* PAN/kitosan dilakukan uji filtrasi untuk mengkaji pengaruh ketebalan membran sebagai filter udara dengan menghitung jumlah partikel sebelum dan setelah filtrasi menggunakan *particle counter*. Hasil uji menunjukkan membran dengan variasi ketebalan  $(144 \pm 1) \mu\text{m}$ ,  $(290 \pm 3) \mu\text{m}$ , dan  $(521 \pm 1) \mu\text{m}$  memiliki nilai efisiensi filtrasi yang relatif sama untuk ukuran partikel 0,3; 0,5; 1; 2,5; 5; dan 10 mikro. Selain itu, dilakukan uji mekanik menggunakan *Universal Testing Machine* (UTM) sehingga diperoleh hasil kuat tekan membran sebesar 2600 Pa, 4200 Pa, dan 5700 Pa. Keseluruhan hasil penelitian menunjukkan bahwa membran PAN/kitosan memiliki kemampuan untuk diaplikasikan sebagai filter udara.

**Kata Kunci** : Membran *nanofiber* PAN/kitosan, *electrospinning*, filtrasi, *Scanning Electron Microscopy* (SEM), *Fourier Transform Infrared* (FTIR), *Particle Counter*, *Universal Testing Machine* (UTM).

## ABSTRACT

### ***STUDY OF THE EFFECT OF POLYACRYLONITRILE (PAN)/CHITOSAN NANOFIBER MEMBRANE THICKNESS AS AIR FILTER***

By :

**Zulfa Hasna Fadhillah**

**17/409406/PA/17713**

*Polyacrylonitrile* (PAN) nanofiber membranes were fabricated by using the electrospinning method for air filter application. The PAN solution was made with a concentration of 6 wt% in DMF solvent, then the PAN membrane was poured with the 2 v/v% chitosan solution. PAN/chitosan membranes with various thicknesses were characterized using *Scanning Electron Microscopy* (SEM) and *Fourier Transform Infrared* (FTIR). The characterization results showed that chitosan affected the morphology and functional groups of the PAN nanofiber membrane. The PAN/chitosan nanofiber membrane was subjected to a filtration test to assess the effect of membrane thickness as an air filter by counting the number of particles before and after filtration using a particle counter. The test results showed that membranes with various thicknesses ( $144 \pm 1$   $\mu\text{m}$ , ( $290 \pm 3$ )  $\mu\text{m}$ , dan ( $521 \pm 1$ )  $\mu\text{m}$  had relatively the same filtration efficiency values for the particle size of 0,3; 0,5; 1; 2,5; 5; and 10 micro. In addition the mechanical test was carried out using *Universal Testing Machine* (UTM) resulted in 2600 Pa, 4200 Pa, and 5700 Pa of mechanical compressive strength. All results showed that PAN/chitosan membrane has capability to be applied as air filter.

**Keywords** : PAN/chitosan nanofiber membrane, electrospinning, filtration, *Scanning Electron Microscopy* (SEM), *Fourier Transform Infrared* (FTIR), Particle Counter, *Universal Testing Machine* (UTM).