

## INTISARI

### KAJIAN PENGARUH KETEBALAN MEMBRAN NANOFIBER PVA/KITOSAN TERHADAP POTENSINYA SEBAGAI FILTER POLUSI UDARA

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Penelitian mengenai pengaruh ketebalan membran nanofiber PVA/Kitosan terhadap potensinya sebagai filter polusi udara telah dilakukan. Membran nanofiber PVA/Kitosan rasio 85/15 v/v % berhasil dibuat dengan metode elektrospinning dan didapatkan membran dengan berbagai ketebalan yaitu  $(150 \pm 1)$   $\mu\text{m}$ ,  $(220 \pm 1)$   $\mu\text{m}$ , dan  $(307 \pm 1)$   $\mu\text{m}$ . Membran tersebut diuji sifat mekaniknya menggunakan *Universal Testing Machine* (UTM), hasilnya menunjukkan bahwa nilai kuat tekan bertambah seiring dengan bertambahnya ketebalan membran. Dalam penelitian ini, membran nanofiber PVA/Kitosan digunakan sebagai filter asap dan diuji menggunakan *Particle Counter* dan *Manometer*. Hasil uji filtrasi menunjukkan bahwa efisiensi membran dengan ketebalan  $(150 \pm 1)$   $\mu\text{m}$ ,  $(220 \pm 1)$   $\mu\text{m}$ ,  $(307 \pm 1)$   $\mu\text{m}$  masing-masing adalah  $(97,9 \pm 0,8)\%$ ;  $(98,5 \pm 0,4)\%$ ; dan  $(98,9 \pm 0,2)\%$ . Hasil SEM menunjukkan membran sebelum filtrasi memiliki diameter fiber  $(250 \pm 2)$  nm dengan porositas 40,7%, dan setelah filtrasi diameter menjadi  $(263 \pm 3)$  nm dengan porositas 26,5%. Perbedaan juga terlihat pada spektrum FTIR dimana hasilnya memperlihatkan adanya puncak serapan baru dan perubahan panjang gelombang pada gugus fungsi N=O *bending* pada bilangan gelombang  $1570\text{cm}^{-1}$ , dan pada bilangan gelombang  $1375\text{cm}^{-1}$  yang merupakan vibrasi dari gugus C-N *stretching*. Hal ini kemungkinan berasal dari senyawa nikotin pada rokok, dan senyawa hasil pembakaran.

**Kata Kunci :** Membran PVA/Kitosan, Elektrospinning, *Universal Testing Machine*, *Particle Counter*, *Manometer*, SEM, FTIR.

## ABSTRACT

### STUDY OF THE EFFECT OF PVA/CHITOSAN NANOFIBERS MEMBRANE THICKNESS ON ITS PROSPECT AS AN AIR POLLUTION FILTER

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Research on the effect of PVA/Chitosan nanofiber membrane thickness on its potential as an air pollution filter has been conducted. PVA/Chitosan nanofiber membranes with a ratio of 85/15 v/v% were successfully fabricated by electrospinning method. The obtained membranes has  $(150 \pm 1) \mu\text{m}$ ,  $(220 \pm 1) \mu\text{m}$ , and  $(307 \pm 1) \mu\text{m}$  in thickness. The mechanical properties of the membrane were characterized using the *Universal Testing Machine* (UTM), the results showed that the compressive strength value increased with the increase of the thickness of the membrane. In this research, PVA/Chitosan nanofiber membrane was used as a smoke filter and tested using a *Particle Counter* and *Manometer*. The results of the filtration test show that the efficiency of the membranes with thickness  $(150 \pm 1) \mu\text{m}$ ,  $(220 \pm 1) \mu\text{m}$ ,  $(307 \pm 1) \mu\text{m}$  are  $(97,9 \pm 0,8)\%$ ;  $(98.5 \pm 0,4)\%$ ; and  $(98.9 \pm 0,2)\%$ , respectively. SEM results showed that the membrane before filtration had a fiber diameter  $(250 \pm 2)\text{nm}$  with a porosity of 40,8%, and after filtration the diameter became  $(263 \pm 3)\text{nm}$  with a porosity of 26,5%. The difference is also seen in the FTIR spectrum where the results show a new absorption peak and a change in wavelength in the N=O bending functional group at a wave number of  $1570\text{cm}^{-1}$ , and at a wave number of  $1375\text{cm}^{-1}$  which is the vibration of the C-N stretching group. This is likely to come from the nicotine compound in cigarettes, and compounds from combustion.

**Keywords :** Membrane PVA/Chitosan, Electrospinning, *Universal Testing Machine*, *Particle Counter*, *Manometer*, SEM, FTIR.