

## INTISARI

### PENGARUH pH BASA TERHADAP KEMAMPUAN *SWELLING* DAN FOTOKATALIS KOMPOSIT PVA/TiO<sub>2</sub>

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Membran nanofiber *polyvinil alcohol* (PVA)/*titanium dioksida* (TiO<sub>2</sub>) telah dibuat dengan metode elektrospinning. Nanofiber di-*crosslink* menggunakan *gutaraldehyde* (GA) untuk menjaga kestabilannya di dalam cairan. Untuk mencegah penggumpalan pada nanopartikel TiO<sub>2</sub> dilakukan *treatment* sonikasi dan penambahan surfaktan *tetramethylammonium hydroxide* (TMAH). Nanofiber PVA/TiO<sub>2</sub> diuji *Scanning Electron Microscopy* (SEM) untuk mengetahui morfologi dan diameter nanofiber. Uji *swelling* untuk mengetahui kemampuan *swelling* nanofiber PVA/TiO<sub>2</sub> dengan merendam pada larutan pH yaitu 7, 8, 9, 10, 11, dan 12 dengan waktu tertentu. Selanjutnya diuji fotokatalis untuk mengetahui kemampuan degradasi dari nanofiber PVA/TiO<sub>2</sub> dengan melarutkan pH 7, 8, 9, 10, 11, dan 12 dalam larutan *methylene blue* (MB). Karakterisasi SEM menunjukkan bahwa rata-rata diameter nanofiber PVA/TiO<sub>2</sub> sebesar (406 ± 167) nm. Hasil uji *swelling* menunjukkan rasio *swelling* menurun seiring dengan naiknya pH basa. Hasil uji fotokatalis menunjukkan kemampuan fotokatalis semakin meningkat seiring dengan meningkatnya nilai pH basa, namun terjadi anomali pada grafik pH 12. Membran fotokatalis nanofiber PVA/TiO<sub>2</sub> mampu mendegradasikan larutan *methylene blue* hingga 92,2% selama 2 jam pada pH 11. Membran fotokatalis nanofiber PVA/TiO<sub>2</sub> juga mempunyai kemampuan dapat digunakan kembali (*reusable*) untuk fotokatalis.

**Kata Kunci : PVA, TiO<sub>2</sub>, *swelling*, fotokatalis, pH basa**

## ABSTRACT

### *EFFECT OF BASIC pH ON SWELLING CAPABILITY AND PHOTOCATALYSIS OF PVA / TiO<sub>2</sub> COMPOSITE*

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*The polyvinil alcohol (PVA)/titanium dioksida (TiO<sub>2</sub>) nanofiber membrane was fabricated successfully by electrospinning methods. Glutaraldehyde crosslinking agent was added to increase membrane stability in water. To prevent the agglomeration of TiO<sub>2</sub> nanoparticles was done by sonication treatment and tetramethylammonium hydroxide (TMAH) surfactant addition. The PVA/TiO<sub>2</sub> nanofiber was investigated by using Scanning Electron Microscopy (SEM) to determine the morphology and the diameter of the nanofiber. Swelling test to determine the swelling ability of PVA/TiO<sub>2</sub> nanofiber by soaking in solution of pH 7, 8, 9, 10, 11, and 12 with a certain time. Next, photocatalyst test to determine the degradation ability of PVA / TiO<sub>2</sub> nanofiber by dissolving pH 7, 8, 9, 10, 11, and 12 in a solution of methylene blue (MB). The characterization of SEM showed that the average diameters of PVA/TiO<sub>2</sub> nanofiber is (406 ± 167) nm. Swelling test indicated that swelling ratio decreases with increasing pH solutions. Photocatalyst test results show the abilities of photocatalyst increases with increasing of base pH, but the anomalies occur on the pH 12 graph. The nanofiber photocatalytic membrane of PVA/TiO<sub>2</sub> has dye removal of methylene blue until 92,2% was degraded for 2 hours at pH 11. The PVA/TiO<sub>2</sub> nanofiber membrane also reuseable for photocatalysts.*

**Keywords : PVA, TiO<sub>2</sub>, swelling, photocatalyst, basic pH**