

INTISARI

KEMAMPUAN FOTOKATALIS KOMPOSIT POLIVINIL ALKOHOL (PVA)/TITANIUM DIOKSIDA (TiO₂) PADA KONDISI ASAM

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Telah berhasil dibuat membran fotokatalis nanofiber PVA/TiO₂ 4/1 dan 4/1,5 dengan metode elektrospinning. Nanofiber di-*crosslink* GA untuk menjaga kestabilannya di dalam cairan. Nanofiber diuji *swelling* dan fotokatalis dengan variasi pH larutan 1, 2, 4 dan 7 kemudian diuji SEM. Pada penelitian tersebut menunjukkan bertambahnya kandungan TiO₂ pada komposit PVA/TiO₂ mengakibatkan diameter nanofiber meningkat. Pengujian *swelling* menunjukkan rasio *swelling* meningkat seiring dengan menurunnya nilai pH dan waktu konstan (τ) meningkat seiring dengan meningkatnya nilai pH. Hasil uji fotokatalis menunjukkan kemampuan fotokatalis semakin meningkat seiring meningkatnya nilai pH, sehingga kurang sensitif terhadap asam. Hasil uji *swelling* dan fotokatalis yang berlawanan tersebut karena mekanisme pendegradasian TiO₂ dalam pH lebih dominan dibanding sifat sensitif nanofiber terhadap pH. Nanofiber 4/1 hanya mampu mendegradasikan sebanyak 18,1% dalam pH 2 MB selama 2 jam, sedangkan nanofiber 4/1,5 hanya mampu mendegradasi sebanyak 4% saja dengan waktu yang sama. Penambahan TiO₂ pada komposit PVA/TiO₂ menyebabkan rasio *swelling* dan kemampuan fotokatalis menurun.

Kata kunci : **PVA, TiO₂, swelling, fotokatalis, nanofiber**

ABSTRACT

PHOTOCATALYS ABILITY OF COMPOSITE POLYVINYL ALCOHOL (PVA)/TITANIUM DIOXIDE (TiO₂) IN ACID CONDITION

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Nanofiber photocatalytic membranes of PVA/TiO₂ 4/1 and 4/1,5 have been done using electrospinning method. Glutaraldehyde crosslinking agent was added to increase membrane stability in water. The nanofiber membranes were tested for their swelling behaviour and photocatalytic activity in various pH solutions of 1, 2, 4 and 7 that were then characterised with SEM. The results indicated that increasing TiO₂ in the PVA/TiO₂ composites will result in the increase of the diameter of the nanofibers. Swelling ratio tends to increase with the decrease of pH of the solution and time constant (τ) tends to increase due to increasing pH solutions. Photocatalytic test indicated that the photocatalytic activity increase with increasing pH solutions. This implies that both nanofiber membranes were not sensitive in acidic condition. The Swelling and photocatalytic activity results have no correlation since degradation mechanisms of TiO₂ in various pH solutions played a more substantial role than the acidic properties of the nanofiber membranes. Nanofiber 4/1 obtained a dye removal percentage of 18,1% in pH 2 with 2 hours photocatalytic light exposure and nanofiber 4/1,5 obtained only 4% under the same conditions. The addition of TiO₂ in the composite causes swelling and photocatalytic dye removal to decrease.

Key words : PVA, TiO₂, swelling, photocatalytic, nanofiber