



## INTISARI

### FABRIKASI DAN KARAKTERISASI NANOFIBER PAN/TiO<sub>2</sub> SEBAGAI MEDIA PENYERAP *METHYLENE BLUE*

Oleh

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Industri batik menghasilkan limbah cair yang mengandung zat warna seperti *Methylene blue* (MB) yang sulit terurai dan dapat mencemari lingkungan. Penelitian ini bertujuan mengembangkan *nanofiber* dari *Polyacrylonitrile* (PAN) dengan pelarut *Dimethylformamide* (DMF) yang dikombinasikan dengan *Titanium dioxide* (TiO<sub>2</sub>) dan *Tetramethylammonium hydroxide* (TMAH) untuk menurunkan warna MB dalam larutan. *Nanofiber* dibuat dengan metode *electrospinning* dan penambahan TiO<sub>2</sub> dengan teknik *drop casting*. Variasi rasio TMAH digunakan untuk mengetahui pengaruhnya terhadap efektivitas degradasi. Karakterisasi dilakukan menggunakan *Fourier-Transform Infrared Spectroscopy* (FTIR), *Scanning Electron Microscopy* (SEM), dan UV-Vis. Hasil menunjukkan PAN 6% hanya mampu menurunkan warna MB sebesar **55,08%**. PAN/TiO<sub>2</sub> A meningkatkan efisiensi degradasi menjadi **74,24%**, dan PAN/TiO<sub>2</sub> B meningkatkan nilai degradasi hingga **88,27%**. Hal ini menunjukkan bahwa kombinasi ketiga bahan menghasilkan permukaan nanofiber yang lebih efektif untuk proses degradasi warna. *Nanofiber* PAN/TiO<sub>2</sub> berpotensi digunakan sebagai bahan media penyerap dalam pengolahan limbah cair yang mengandung zat pewarna sintesis.

**Kata kunci** : Adsorpsi, *Methylene blue*, *Nanofiber*, *Polyacrylonitrile*



## ABSTRACT

### ***FABRICATION AND CHARACTERIZATION OF PAN/TiO<sub>2</sub> NANOFIBERS AS METHYLENE BLUE ADSORPTION MEDIA***

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The batik industry produces liquid waste containing dyes such as Methylene blue (MB) which are difficult to decompose and can pollute the environment. This study aims to develop nanofibers from Polyacrylonitrile (PAN) with Dimethylformamide (DMF) solvent combined with Titanium dioxide (TiO<sub>2</sub>) and Tetramethylammonium hydroxide (TMAH) to reduce the color of MB in solution. Nanofibers were made by electrospinning method and the addition of TiO<sub>2</sub> with drop casting technique. Variation of TMAH ratio was used to determine its effect on degradation effectiveness. Characterization was carried out using Fourier-Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopy (SEM), and UV-Vis. The results showed that PAN 6% was only able to reduce the color of MB by 55.08%. PAN/TiO<sub>2</sub> A increased the degradation efficiency to 74.24%, and PAN/TiO<sub>2</sub> B increased the degradation value to 88.27%. This shows that the combination of the three materials produces a more effective nanofiber surface for the color degradation process. PAN/TiO<sub>2</sub> nanofibers have the potential to be used as an adsorbent media material in the treatment of liquid waste containing synthetic dyes.

***Keywords:*** *Adsorption, Methylene Blue, Nanofiber, Polyacrylonitrile*