

# Sintesis dan karakteristik Fe<sub>2</sub>O<sub>3</sub>, Mn<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>/Mn<sub>2</sub>O<sub>3</sub> dan Fe<sub>2</sub>O<sub>3</sub>/Mn<sub>2</sub>O<sub>3</sub>/Graphene dalam aktivitas foto-fenton untuk mendegradasi limbah pewarna = Synthesized and characterization of Fe<sub>2</sub>O<sub>3</sub>, Mn<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>/Mn<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub>/Mn<sub>2</sub>O<sub>3</sub>/Graphene in photo-fenton activity for dye waste degradation

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## Abstrak

Nanokomposit Fe<sub>2</sub>O<sub>3</sub>/Mn<sub>2</sub>O<sub>3</sub>-Grafena dengan variasi persen berat grafena berhasil disintesis dengan metode hidrotermal. Hasil X-ray Diffraction (XRD) dapat menunjukkan bahwa sampel tidak memiliki pengotor. Kehadiran graphene dalam nanokomposit telah berhasil ditunjukkan dengan mengukur spektroskopi Raman dan spektroskopi sinar-X dispersif energi (EDX). Peningkatan spesifik dalam area sampel seiring bertambahnya graphene, dapat dikonfirmasi melalui isoterm adsorpsi-desorpsi N<sub>2</sub>. Vibrating Sample Magnetometer (VSM) menunjukkan bahwa magnetisme sampel menurun dengan meningkatnya graphene. Uji aktivitas foto-Fenton nanokomposit Fe<sub>2</sub>O<sub>3</sub>/Mn<sub>2</sub>O<sub>3</sub> dengan adanya graphene digunakan untuk mengevaluasi degradasi metilen biru (MB) dan jingga metil (MO) di bawah paparan sinar UV. Hasil foto-Fenton optimum diperoleh pada nanokomposit Fe<sub>2</sub>O<sub>3</sub>/Mn<sub>2</sub>O<sub>3</sub>-7G 0,2 g/L dengan 2 mL H<sub>2</sub>O<sub>2</sub> pada pH 4. Spesies aktif yang berperan dalam aktivitas foto-Fenton adalah OH . Nanokomposit Fe<sub>2</sub>O<sub>3</sub> /Mn<sub>2</sub>O<sub>3</sub>-7G juga menunjukkan sifat dapat digunakan kembali.

.....Fe<sub>2</sub>O<sub>3</sub>/Mn<sub>2</sub>O<sub>3</sub>-Graphene nanocomposite with various weight percent graphene was successfully synthesized by hydrothermal method. The results of X-ray Diffraction (XRD) can show that the sample has no impurities. The presence of graphene in nanocomposites has been successfully demonstrated by measuring Raman spectroscopy and energy dispersive X-ray spectroscopy (EDX). The specific increase in sample area as graphene increases, can be confirmed through the N<sub>2</sub> adsorption-desorption isotherm. The Vibrating Sample Magnetometer (VSM) shows that the magnetism of the sample decreases with increasing graphene. Photo-Fenton activity test of Fe<sub>2</sub>O<sub>3</sub>/Mn<sub>2</sub>O<sub>3</sub> nanocomposite in the presence of graphene was used to evaluate the degradation of methylene blue (MB) and methyl orange (MO) under UV light exposure. Optimum photo-Fenton results were obtained on Fe<sub>2</sub>O<sub>3</sub>/Mn<sub>2</sub>O<sub>3</sub>-7G 0.2 g/L nanocomposite with 2 mL H<sub>2</sub>O<sub>2</sub> at pH 4. The active species that played a role in photo-Fenton activity was OH. Fe<sub>2</sub>O<sub>3</sub>/Mn<sub>2</sub>O<sub>3</sub>-7G nanocomposites also showed reusability.