

# Studi pengaruh penambahan nanographen platelets dan perak terhadap peningkatan aktivitas photo-, sono-, sonophoto- catalytic dari Fe<sub>3</sub>O<sub>4</sub>/CuO/TiO<sub>2</sub> nanocomposites = Study of influence of the addition nanographene platetlets and silver on improve photo-, sono-, sonophoto-catalytic of Fe<sub>3</sub>O<sub>4</sub>/CuO/TiO<sub>2</sub> nanocomposites

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## Abstrak

Sampel Fe<sub>3</sub>O<sub>4</sub>/CuO/TiO<sub>2</sub>/NGP composites dengan varaisi weight percent NGP 5, 10,15 wt telah sukses disintesis dengan menggunakan metode co-precipitation. Pengukuran X-ray Diffraction XRD , Energy Dispersive X-ray EDX , Fourier Tansform Infrared FTIR , Vibrating Sample Magnetometer VSM , Thermogravimetric Analysis TGA , nitrogen adsorptionspectroscopy, dan UV-Visible spectroscopy UV-Vis spectroscopy yang digunakan untuk melihat struktur, elemen penyusun, vibrasi molekul, sifat magnetic, stabilitas thermal, luas permukaan, dan nilai band gap dari sampel Fe<sub>3</sub>O<sub>4</sub>/CuO/TiO<sub>2</sub>/NGP composites. Aktivitas catalytic yang diujikan pada sampel yaitu photo-,sono-,sonophoto-catalytic yang dilakukan dengan mengamati degradasi warna methylene blue MB . Hasil dari aktivitas catalytic menunjukkan seiring penambahan nanograhene platelets NGP pada sampel meningkatkan kemampuan catalytic composites. Composites dengan 10 wt NGP menunjukkan aktivitas catalytic yang paling baik. Kemudian, Ag ditambahkan Fe<sub>3</sub>O<sub>4</sub>/CuO/TiO<sub>2</sub>/NGP composites disintesis dengan menggunakan metode co-precipitation. Fe<sub>3</sub>O<sub>4</sub>/CuO/TiO<sub>2</sub>/NGP/Ag composites dengan variasi weight percent Ag 5, 15, 25 wt dilakukan pengukuran X-ray Diffraction XRD , UV-Visible spectroscopy, dan Thermogravimetric Analysis TGA . Hasil aktivitas catalytic dari Fe<sub>3</sub>O<sub>4</sub>/CuO/TiO<sub>2</sub>/NGP/Ag composites didapatkan bahwa sampel dengan 25wt Ag memiliki kemampuan catalytic yang paling baik dalam mendegradasi methylene blue. Dari hasil aktivitas catalytic tersebut terlihat bahwa Ag dapat meningkatkan kemampuan catalytic sampel.

.....Samples of Fe<sub>3</sub>O<sub>4</sub> CuO TiO<sub>2</sub> NGP composites were varied weight percent of NGP 5, 10, 15wt were successfully synthesized using co precipitation method. All prepared samples were characterized using X ray Diffraction XRD , Energy Dispersive X ray EDX , Fourier Tansform Infrared FTIR , Vibrating Sample Magnetometer VSM , Thermogravimetric Analysis TGA , nitrogen adsorption spectroscopy, dan UV Visible spectroscopy UV Vis spectroscopy to determine the structure, composition element, molecules bonding, magnetic properties, thermal stability, surface area, dan band gap of the Fe<sub>3</sub>O<sub>4</sub> CuO TiO<sub>2</sub> NGP composites. Catalytic activities were tested to all of samples is photo , sono , sonophoto catalytic to degrade methylene blue MB . The results of catalytic activities showed that the addition of NGP on samples could enhance catalytic ability of samples. Sample with 10wt NGP showed the best catalytic activity than the other variation samples. Fe<sub>3</sub>O<sub>4</sub> CuO TiO<sub>2</sub> NGP Ag composites with variation weight percent of Ag 5, 15, 25wt composites were successfully synthesized using co precipitation method and were characterized using X ray Diffraction XRD , UV Visible spectroscopy, dan Thermogravimetric Analysis TGA . The results of cataylytic activities of Fe<sub>3</sub>O<sub>4</sub> CuO TiO<sub>2</sub> NGP Ag composites showed that the addition Ag could enhance catalytic ability sample. Sample with 25wt Ag have best catalytic ability than the other samples.