

Sintesis dan karakterisasi nanokomposit MgFe<sub>2</sub>O<sub>4</sub> dan MgFe<sub>2</sub>O<sub>4</sub>/NGP untuk degradasi limbah pewarna methylene blue melalui proses photocatalytic = Synthesize and characterization of nanocomposite MgFe<sub>2</sub>O<sub>4</sub> and MgFe<sub>2</sub>O<sub>4</sub>/NGP for methylene blue degradation by photocatalytic process.

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Abstrak

Pada studi ini, saya menggunakan metode fotokatalitik untuk mendegradasi limbah cat pewarna organik dalam limbah air menggunakan MgFe<sub>2</sub>O<sub>4</sub> dan MgFe<sub>2</sub>O<sub>4</sub>-nanographene (MgFe<sub>2</sub>O<sub>4</sub>/NGP) nanopartikel. MgFe<sub>2</sub>O<sub>4</sub> dan MgFe<sub>2</sub>O<sub>4</sub>/NGP (mengandung persentase NGP yang bervariasi) disintesis melalui metode hidrotermal. Kedua bahan ini digunakan sebagai katalis dalam proses fotokatalitik mendegradasi limbah organik Methylene-Blue dalam solusi cair, dibawah radiasi cahaya merah. Karakteristik dari sample (MgFe<sub>2</sub>O<sub>4</sub> & MgFe<sub>2</sub>O<sub>4</sub>/NGP) dilakukan menggunakan X-ray Diffraction, Raman Spectroscopy, UVVIS Spectroscopy, XRF, TGA, BJH, XPS, TEM, HRTEM, SAED, EDX dan BET. Hasil dari penelitian ini menunjukkan bahwa MgFe<sub>2</sub>O<sub>4</sub>/NGP mempunyai kemampuan fotokatalitik yang lebih baik dibandingkan dengan MgFe<sub>2</sub>O<sub>4</sub>. Efek dari konsentrasi NGP (wt%) untuk mendegradasi MB didiskusikan. Spesies aktif dalam proses fotokatalitik juga dipelajari melalui scavenger test.

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In the current study, we use the photodegradation method for the removal of organic dye molecule in wastewater using MgFe<sub>2</sub>O<sub>4</sub> and MgFe<sub>2</sub>O<sub>4</sub>-nanographene platelets (MgFe<sub>2</sub>O<sub>4</sub>/NGP) nanoparticles. MgFe<sub>2</sub>O<sub>4</sub> and MgFe<sub>2</sub>O<sub>4</sub>/NGP (containing various amounts of NGP) were synthesized using the hydrothermal method. Both of them used as a catalyst for photocatalytic degradation of methylene blue (MB), i.e. our organic dye in aqueous solution under red light irradiation. Characteristics of our samples (MgFe<sub>2</sub>O<sub>4</sub> & MgFe<sub>2</sub>O<sub>4</sub>/NGP) were characterized using X-ray diffraction, Raman Spectroscopy, UVVIS Spectroscopy, XRF, TGA, BJH, XPS, TEM, HRTEM, SAED, EDX, and BET. The result of our work showed that MgFe<sub>2</sub>O<sub>4</sub>/NGP mostly have a better photocatalytic performance compared to pure MgFe<sub>2</sub>O<sub>4</sub>. The effect of NGP concentration (wt%) on the photocatalytic degradation of MB was discussed. Active species who'd take effect on the photocatalytic process was also studied by the scavenger test.