Pengaruh Variasi Waktu Penyinaran Pada Degradasi Metilen Biru Menggunakan Komposit Magnetik Grafena Oksida Tereduksi (rGO/Fe_3O_4) Termodifikasi Surfaktan SDS

INTISARI

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Penelitian ini bertujuan untuk mengetahui daya fotokatalis komposit magnetit rGO/Fe_3O_4 yang termodifikasi surfaktan terhadap zat warna metilen biru. Pembuatan grafena oksida (GO) dilakukan menggunakan metode Hummers. Sintesis rGO/Fe_3O_4/SDS dilakukan dengan metode hidrotermal dengan menggunakan autoklaf yang dipanaskan dalam oven pada suhu 180 ^oC selama 8 jam. Morfologi permukaan rGO/Fe_3O_4/SDS dianalisis menggunakan *Scanning Electron Microscope-Energy Dispersive X-Ray* (SEM-EDX) dan gugus fungsi dianalisis menggunakan spektroskopi *Fourier Transform Infra-Red* (FTIR). Selanjutnya dilakukan uji fotokatalis rGO/Fe_3O_4/SDS terhadap zat warna MB dan dianalisis menggunakan spektroskopi Ultra Violet-Visible (UV-Vis) . Hasil SEM menunjukan menunjukan morfologi lembaran dua dimensi yaitu Fe_3O_4 yang menempel pada permukaan grafena dan hasil EDX terdapat unsur karbon (C), besi (Fe) dan Oksigen (O). Hasil FTIR menunjukan gugus fungsi O-H, C≡C, C=O, C-OH, dan Fe-O. Berdasarkan aplikasi fotokatalis pada variasi waktu penyinaran sinar UV diperoleh hasil optimum pada waktu 20 menit dengan persen degradasi sebesar 72,96% dan pada variasi waktu penyinaran sinar matahari diperoleh hasil optimum pada waktu 40 menit dengan persen degradasi sebesar 91,57%.

Kata kunci : Reduksi grafena oksida (rGO), Surfaktan SDS, Metilen Biru, Fotokatalis.

The Effect of Variation of Irradiation Time on the Degradation of Methylene Blue Using Reduced Graphene Oxide Magnetic Composite (rGO/Fe_3O_4) Modified SDS Surfactant

ABSTRACT

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This research aims to determine the photocatalytic power of surfactant-modified rGO/Fe_3O_4 magnetite composites on methylene blue dye. The manufacture of graphene oxide (GO) was carried out using the Hummers method. Synthesis of rGO/Fe_3O_4/SDS was carried out by hydrothermal method using an autoclave heated in an oven at 180 ^oC for 8 hours. Surface morphology of rGO/Fe_3O_4/SDS was analyzed using Scanning Electron Microscope-Energy Dispersive X-Ray (SEM-EDX) and functional groups were analyzed using Fourier Transform Infra-Red (FTIR) spectroscopy. Then the rGO/Fe_3O_4/SDS photocatalyst test was performed on MB dye and analyzed using Ultra Violet-Visible (UV-Vis) spectroscopy. SEM results show two-dimensional sheet morphology, namely Fe_3O_4 attached to the graphene surface and the EDX results contain elements of carbon (C), iron (Fe) and oxygen (O). FTIR results showed the functional groups O-H, C≡C, C=O, C-OH, and Fe-O. Based on the application of photocatalysts at variations in UV irradiation time, optimum results were obtained at 20 minutes with a degradation percent of 72,96% and at variations in sunlight irradiation time optimum results were obtained at 40 minutes with a degradation percent of 91.57%.

Keywords : Reduction of graphene oxide (rGO), SDS surfactant, Methylene Blue, Photocatalyst.