Pengaruh graphene dan nanographene platelets ngp sebagai supporting adsorbent dan katalis untuk degradasi methylene blue = The role of graphene and nanographene platelets as supporting absorbance and catalyst for methylene blue removal

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Abstrak

Pada penelitian ini, dua jenis graphene graphene dan nanographene platelets NGP dipergunakan sebagai supporting adsorbent dan juga katalis untuk proses degradasi limbah pewarna. Material graphene dan NGP dipergunakan untuk men-support kemampuan adsorpsi dari material nanopartikel Fe3O4. Kemampuan adsorpsi dari nanopartikel Fe3O4 meningkat dengan penambahan material NGP dan graphene. Penambahan material graphene pada Fe3O4 menunjukan kemampuan adsorpsi yang paling baik dibandingkan dengan penambahan material NGP. Material NGP dan graphene juga dipergunakan untuk meningkatkan kemampuan fotokatalitik nanokomposit Fe3O4/ZnO/CuO FZC dibawah penyinaran cahaya ultraviolet UV dan cahaya tampak serta kemampuan sonophotocatalytic dibawah radiasi UV ultrasound US dan cahaya tampak US . Penambahan material graphene menghasilkan kemampuan adsorpsi dan aktivitas fotokatalitik dikarenakan memiliki luasan area yang lebih besar serta oxygen functional group dari material graphene. Penambahan material NGP dan graphene juga mampu menghambat laju rekombinasi elektron dan hole dikarenakan kemampuan graphene dan NGP untuk bertindak sebagai electron acceptor. Hal tersebut berdampak terhadap peningkatan kemampuan aktivitas katalitik dari sampel. Sifat fisis dari seluruh material dianalisis menggunakan X-ray diffractions XRD , energy dispersive X-ray EDX , transmission electron microscope TEM , UV-Vis diffuse reflectance spectroscopy, Fourier transform Infra-red FT-IR spectroscopy Raman spectroscopy, Brunauer ndash;Emmett ndash;Teller BET , differential thermal analysis and thermogravimetric analysis DTA/TGA , vibrating sample magnetometer VSM.
.....In this study, two types of Carbon nanographene platelets NGP and graphene has been used as supporting adsorbent and catalyst for waste water removal. Both NGP and graphene were used to support the adsorption ability of Fe3O4 nanoparticles. The adsorption ability of Fe3O4 was increase with the incorporation of NGP and graphene. The incorporation of graphene resulted in the higher adsorption ability of the samples. Moreover, NGP and graphene also used to support the photocatalytic performance under UV and visible light irradiation as well as sonophotocatalytic under UV ultrasound US and visible US of Fe3O4 ZnO CuO FZC nanocomposites. The incorporation of graphene has better adsorption and catalytic performance than the incorporation of NGP due to the higher specific surface area and also the oxygen functional group in graphene materials. The incorporation of NGP and graphene has an ability to prevent recombination electron and hole due to both NGP and graphene could act as electron acceptors. It impacts on the improvement the catalytic performance. The combination of The physical properties of the samples was investigated using X ray diffractions XRD , energy dispersive X ray EDX , transmission electron microscope TEM , UV Vis diffuse reflectance spectroscopy, Fourier transform Infra red FT IR spectroscopy, Raman spectroscopy, Brunauer ndash Emmett ndash Teller BET , differential thermal analysis and thermogravimetric analysis DTA TGA , vibrating sample magnetometer VSM.