Studi karakterisasi SnO2/nanographene platelets (NGP) untuk aplikasi degradasi limbah pewarna melalui proses adsorpsi, photo-, sono-, sonophoto- catalytic = Characterization study of SnO2/nanographene platelets (NGP) for dye waste degradation application through adsorption, photo-, sono-, sonophoto- catalytic

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Abstrak

ABSTRAK
Nanoparticle SnO2 dan nanocomposites SnO2/NGP dengan variasi weight percent wt dari NGP 5wt , 10wt dan 15wt masing-masing disintesis menggunakan metode sol gel dan co-precipitation. Sifat degradasi termal, morfologi dan struktur dianalsis menggunakan spectroscopy TGA Thermogravimetric Analysis , XRD Xray Diffraction , TEM Transmission Electron Spectroscopy , FTIR Fourier Transform Infrared , serta EDX Energy Dispersive X-ray . Dari pengukuran EDX diketahui bahwa keberadaan dari atom C pada nanokomopsit SnO2/NGP mengonfirmasi adanya material NGP pada nanocomposites. Luas permukaan SnO2 nanoparticle meningkat seiring dengan peningkatan wt NGP pada nanocomposites. Pengujian aktivitas photo-, sono-, dan sonophoto- catalytic sampel nanoparticle dan nanocomposites dilakukan dengan mengamati degradasi warna methylene blue MB masing-masing dibawah pemaparan cahaya ultraviolet, ultrasonic, dan gabungan keduanya. Seiring dengan penambahan wt NGP aktivitas photo-, sono-, dan sonophoto- catalytic nanocomposites menjadi semakin meningkat. pH optimum larutan uji diperoleh pada pH 13, serta spesies yang paling berperan dalam aktivitas photo-, sono- dan sonophoto- catalytic adalah hole>OH radikal>elektron.
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ABSTRACT
SnO2 nanoparticle and SnO2 NGP nanocomposites with various weight percent wt of NGP 5wt , 10wt and 15wt were successfully prepared by sol gel and co precipitation method, respectively. Thermal degradation properties, morphology and structural properties were characterized using TGA Thermogravimetric Analysis , XRD X ray Diffraction , TEM Transmission Electron Spectroscopy , FTIR Fourier Transform Infrared , and EDX Energy Dispersive X ray . From EDX results show that the addition of C atomic in SnO2 NGP nanocomposite could be confirm the existence of NGP content in nanocomposites. Surface area of SnO2 nanoparticle increase with the increasing of wt NGP in nanocomposites. Photo , sono and sonophoto catalytic examination of the nanoparticle and nanocomposites was carried out using aqueous solution of methylene blue MB under ultraviolet, ultrasonic and combination of both irradiation, respectively. The highest photo , sono and sonophoto catalytic occurred with sampel SnO2 NGP 10wt nanocomposite at alkaline condition. The main species which contributed in photo , sono and sonophoto catalytic activity were hole hydroxyl radical electron.