

Sintesis komposit carbon nanotubes titania untuk fotodegradasi fenol sebagai senyawa model limbah industri farmasi = Synthesis of carbon nanotubes titania composite for photodegradation phenol as a model compound pharmaceutical industry waste

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Abstrak

Komposit Multi-Walled Carbon Nanotubes (MWCNT)/Titania telah disintesis untuk mendegradasi fenol sebagai model limbah industri farmasi. Sintesis komposit MWCNT/Titania dilakukan dengan pretreatment asam kepada MWCNT, pengaturan pH larutan dan metode ultrasonikasi. Sampel dikarakterisasi dengan FE-SEM/EDX, XRD dan UV-Vis DRS. Hasil karakterisasi FE-SEM/EDX, XRD dan UV-Vis DRS menunjukkan bentuk komposit yang homogen dengan kristal fasa anatase dan rutile yang berukuran 14 nm dan 15 nm serta tingkat celah energi sebesar 3,05 eV. pH pengkompositan MWCNT/Titania optimum untuk mendegradasi fenol adalah pH 3. Komposisi MWCNT optimum dengan aktivitas fotokatalis tinggi yaitu 3% berat. Komposit MWCNT/TiO₂ mampu mendegradasi senyawa fenol hingga 100% setelah 4 jam pengujian.

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Multi-Walled Carbon Nanotubes (MWCNT)/Titania composite have been synthesized to degrade phenol as a model of the pharmaceutical industry waste. Synthesis of Composite MWCNT/Titania performed with acid pretreatment of MWCNT, solution pH adjustment and ultrasonication. The samples were characterized by FE-SEM/EDX, XRD and UV-Vis DRS. The results of the characterization of FE-SEM/EDX, XRD and UV-Vis DRS showed a homogeneous composite form with crystalline anatase and rutile phase measuring 14 nm and 15 nm as well as the energy band-gap of 3.05 eV. pH optimum composite MWCNT/Titania to degrade phenol is pH 3. Composition optimum MWCNT with high photocatalytic activity of 3% by weight. MWCNT/TiO₂ composite able to degradate phenol up to 100% after 4 hours of testing.