Pengaruh Jenis dan Komposisi Logam Kokatalis (M = Ni, Cu, Zn) terhadap Kinerja Fotokatalisis Komposit M/TiO2/g-C3N4 untuk Degradasi Limbah Ciprofloksasin = Effect of Type and Composition of Metal Catalyst (M = Ni, Cu, Zn) on Photocatalysis Performance of M/TiO2/g-C3N4 Composite for Ciprofloxacin Waste Degradation

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Abstrak

Fotokatalis (M = Ni, Cu, Zn)/TiO2/g-C3N4 disiapkan menggunakan metode wet impregnation dengan memvariasikan konsentrasi setiap jenis logamnya. Variasi jenis logam dan komposisinya dipelajari untuk melihat pengaruhnya terhadap degradasi limbah farmasi antibiotik, Ciprofloksasin. Analisis karakterisasi katalis dan produk dilakukan dengan UV-Vis, UV-Vis Diffuse Reflectance Spectroscopy (UV-Vis DRS), dan Fourier Transform Infrared Spectroscopy (FTIR). Dari hasil karakterisasi didapatkan nilai band gap terkecil sebesar 2.4 eV pada katalis (2) Zn/TiO2/g-C3N4. Uji degradasi Ciprofloksasin dilakukan di dalam fotoreaktor dengan penyinaran internal menggunakan lampu UV 20 Watt. Hasil degradasi dengan kalsinasi gas nitrogen pada variasi logam nikel terbaik sebesar 17% pada katalis (2) Ni/TiO2/g-C3N4, variasi logam tembaga terbaik sebesar 26% pada katalis (4) Cu/TiO2/g-C3N4, dan variasi logam seng terbaik sebesar 28% pada katalis (2) Zn/TiO2/g-C3N4.

......Photocatalysts (M = Ni, Cu, Zn)/ TiO2/g-C3N4 were prepared using wet impregnation method by varying the concentration of each metal type. The variation of metal type and its composition was studied to see its effect on the degradation of pharmaceutical waste antibiotic, Ciprofloxacin. Characterization analysis of the catalyst and product was carried out by UV-Vis, UV-Vis Diffuse Reflectance Spectroscopy (UV-Vis DRS), and Fourier Transform Infrared Spectroscopy (FTIR). From the characterization results, the smallest band gap value of 2.4 eV was obtained on (2) Zn/TiO2/g-C3N4 catalyst. Ciprofloxacin degradation test was conducted in a photoreactor with internal irradiation using a 20 Watt UV lamp. The degradation results with nitrogen gas calcination on the best nickel metal variation was 17% on (2) Ni/TiO2/g-C3N4 catalyst, the best copper metal variation was 26% on (4) Cu/TiO2/g-C3N4 catalyst, and the best iron metal variation was 28% on (2) Zn/TiO2/g-C3N4 catalyst.