

Synthesis of MFe_2O_4/CNS ($M = Zn, Ni, Mn$) Composites from Rice Husk By Hydrothermal - Microwave Method for Remediation Of Paddy Field

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MFe_2O_4/CNS were prepared using hydrothermal - microwave method. This research studied influence of cations (M) toward functional groups of composites and their performances in pesticide degradation. Rice husk was pyrolyzed hydrothermally ($200^\circ C$, 6 h) and by microwave (800 W, 40 minutes). Each product was mixed with MCl_2 (Zn, Ni, Mn), $FeCl_3$, KOH , water and calcined ($600^\circ C$, 15 minutes) to obtain the composite. FTIR spectra of the composites showed different band sharpness related to C-O, C-H out of plane, and M-O. A mixture of the dried paddy farm soil, composite, BPMC (butylphenylmethyl carbamate) pesticide solution (0.25%), and H_2O_2 solution (0.15%) was kept at dark for 48 h. Solution above the soil was filtered and measured with UV-Vis spectrophotometer at 217 nm. Applications without composite and composite - H_2O_2 were also conducted. Result of research showed that dark BPMC degradation with the composite was 8.3 times larger than without composite and 4.6 times larger than without composite - H_2O_2 . No significantly different FTIR spectra of the soil, soil - BPMC, soil - BPMC - H_2O_2 , and soil - BPMC - H_2O_2 composite. No significant difference of the X-ray diffractograms for dried soil and soil after application for pesticide degradation using the composite. Characterization of the best composite based on its performance for dark degradation by XRD confirmed $ZnFe_2O_4/CNS$ structure as the main product and ZnO as impurity.

Biography

Tutik Setianingsih has completed doctoral degree of Chemical Science at 2016 in Gadjah Mada University, Department of Chemistry, field of Inorganic Chemistry. He has published 5 books in Indonesian Language and 6 scopus journals. She works in Department of Chemistry Brawijaya University, group of Inorganic Chemistry lecturers.