

ABSTRAK

KINERJA FOTOKATALIS DAN ANTIBAKTERI ZnO TERDOPING Mg/Cu/N

ZnO merupakan material semikonduktor yang dapat diaplikasikan pada berbagai bidang seperti fotokatalis dan antibakteri. Sintesis ZnO, Cu/N-ZnO, dan Mg/Cu/N-ZnO menggunakan metode *solid-state* dengan suhu kalsinasi 500 °C selama 5 jam. Prekursor yang digunakan pada penelitian ini diantaranya adalah Zn asetat, Mg asetat, Cu asetat, dan urea. Penelitian ini dilakukan untuk mengetahui pengaruh penambahan dopan Mg, Cu, N pada ZnO terhadap karakteristik, morfologi, kinerja fotokatalis, dan aktivitas antibakteri ZnO hasil sintesis. Berdasarkan hasil analisis menggunakan instrumen XRD, SEM, Spektroskopi Raman, Spektroskopi Fotoluminesen, dan UV-DRS diketahui bahwa penambahan dopan Mg, Cu, N pada ZnO mempengaruhi karakteristik dan morfologi ZnO hasil sintesis. Selain itu, penambahan dopan Mg, Cu, N pada ZnO juga mempengaruhi kinerja fotokatalis dan antibakteri dari ZnO hasil sintesis. Hasil pengujian fotokatalis terhadap metil violet selama 120 menit menunjukkan bahwa efisiensi degradasi fotokatalitik sebesar 80,89; 83,49; dan 93,41 % untuk masing-masing sampel ZnO, Cu/N-ZnO, dan Mg/Cu/N-ZnO. Hasil pengujian aktivitas antibakteri menunjukkan bahwa ZnO dan Cu/N-ZnO memiliki aktivitas antibakteri terhadap bakteri *E. coli* dan *S. aureus*. Sedangkan Mg/Cu/N-ZnO hanya memiliki aktivitas antibakteri terhadap bakteri *S. aureus*.

Kata-kata kunci: ZnO; Cu/N-ZnO; Mg/Cu/N-ZnO; fotokatalis; antibakteri.

ABSTRACT

PHOTOCATALYST AND ANTIBACTERIAL PERFORMANCE OF ZnO DOPED Mg/Cu/N

ZnO is a semiconductor material that can be applied in various fields such as photocatalyst and antibacterial. Synthesis of ZnO, Cu/N-ZnO, and Mg/Cu/N-ZnO using the solid-state method with a calcination temperature of 500 °C for 5 hours. The precursors used in this study include Zn acetate, Mg acetate, Cu acetate, and urea. This research was conducted to determine the effect of adding dopant Mg, Cu, and N to ZnO on the characteristics, morphology, photocatalyst performance, and antibacterial activity of synthesized ZnO. Based on the results of the analysis using XRD, SEM, Raman Spectroscopy, Photoluminescent Spectroscopy, and UV-DRS instruments, it is known that the addition of Mg, Cu, and N dopants to ZnO affects the characteristics and morphology of the synthesized ZnO. Besides that, the addition of Mg, Cu, and N dopant to ZnO also affected the photocatalyst and antibacterial performance of the synthesized ZnO. The results of the photocatalytic test on methyl violet for 120 minutes showed that the efficiency of photocatalytic degradation was 80,89; 83,49; and 93,41% for ZnO, Cu/N-ZnO, and Mg/Cu/N-ZnO samples, respectively. The results of the antibacterial activity test showed that ZnO and Cu/N-ZnO had antibacterial activity against E. coli and S. aureus bacteria. Meanwhile, Mg/Cu/N-ZnO only had antibacterial activity against S. aureus bacteria.

Keywords: ZnO; Cu/N-ZnO; Mg/Cu/N-ZnO; photocatalyst; antibacterial.