

ABSTRAK

SINTESIS, KARAKTERISASI DAN APLIKASI NANOMATERIAL S/CuO/nGO YANG DIIRADIASI SINAR *VISIBLE* SEBAGAI ANTIBAKTERI TERHADAP BAKTERI *ESCHERICHIA COLI* DAN *BACILLUS SP*

Oleh

SYANGAP DININGRAT SITOMPUL

Pada penelitian ini, telah dilakukan sintesis dan karakterisasi *nanosheets* GO menggunakan metode Hummers termodifikasi dan ultrasonikasi, CuO menggunakan metode sol gel, dopan sulfur kedalam CuO menghasilkan masing-masing katalis S/CuO 0,25/1 dan S/CuO 0,75/1, dan impregnasi katalis S/CuO ke *nanosheets* GO menggunakan metode impregnasi basah dengan bantuan alat *ultrasonic cleaner*, diperoleh nanomaterial S/CuO/nGO dengan perbandingan masing-masing 0,25/1 dan 0,75/1 yang kemudian dianalisis menggunakan XRD dan diperoleh nanomaterial berukuran 40,75 dan 47,03 nm. Hasil analisis menggunakan DRS diperoleh nilai energi *band-gap* masing-masing nanomaterial S/CuO/nGO sebesar 0,97 eV dan 1,25 eV. Sampel *nanosheets* GO, CuO, S/CuO (0,25/1; 0,75/1) dan S/CuO/nGO (0,25/1; 0,75/1) selanjutnya dilakukan uji antibakteri menggunakan metode MIC dan Difusi cakram. Hasil yang diperoleh dari metode MIC yaitu nanomaterial S/CuO/nGO 0,75/1 memiliki sensitivitas yang paling baik yaitu pada konsentrasi 0,01 mg/mL (bakteri *Escherichia coli*) dan 0,00125 mg/mL (bakteri *Bacillus sp*). Hasil konsentrasi MIC kemudian dilanjutkan pengujian menggunakan metode Difusi cakram dan diperoleh hasil, sampel *nanosheets* GO, CuO, S/CuO (0,25/1; 0,75/1) dan S/CuO/nGO (0,25/1; 0,75/1) teridentifikasi memiliki zona bening lebih maksimal pada perlakuan tanpa sinar yaitu kisaran 2-6 mm.

Kata kunci: *Nanosheets* GO, S/CuO/nGO, Katalis, MIC, Difusi cakram

ABSTRACT

SYNTHESIS, CHARACTERIZATION AND APPLICATION OF NANOMATERIALS S/CUO/nGO BY IRRADIATED VISIBLE LIGHT AN ANTIBACTERIAL AGAINTS *ESCHERICHIA COLI* AND *BACILLUS SP* BACTERIA

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SYANGAP DININGRAT SITOMPUL

In this research, synthesis and characterization of *nanosheets* GO were succesfully by using modified Hummers and ultrasonication method, CuO using the sol gel method, sulfur doped into CuO obtained S/CuO 0.25/1 and 0.75/1 catalyst respectively, and impregnation S/CuO catalyst to *nanosheets* GO with the wet impregnation method with helping of an ultrasonic cleaner instrument, S/CuO/nGO nanomaterials were obtained with a ratio of respectively 0.25/1 and 0.75/1 and then analyzed by using XRD and obtained nanomaterials measuring 40.75 and 47.03 nm. Based on the results of the analysis using DRS, the band gap energy values for each S/CuO/nGO nanomaterials were 0.97 and 1.25 eV. *Nanosheets* GO, CuO, S/CuO (0.25/1; 0.75/1) and S/CuO/nGO (0.25/1; 0.75/1) samples will subjected to antibacterial tests using MIC and Diffusion disc methods. The results by the MIC method, S/CuO/nGO 0.75/1 nanomaterials, had the best sensitivity at concentrations of 0.00125 mg/mL (*Escherichia coli* bacteria) and 0.01 mg/mL (*Bacillus sp* bacteria). Then, the MIC concentration was continued with the disc diffusion method and the results were obtained *nanosheets* GO, CuO, S/CuO (0.25/1; 0.75/1) and S/CuO/nGO (0.25/1; 0.75. /1) was identified as having a clearer zone that was maximum in the treatment without light, which was in the range of 2-6 mm

Keywords: *Nanosheets* GO, S/CuO/nGO, Catalyst, MIC, Disk Diffusion