ABSTRAK

SINTESIS DAN KARAKTERISASI *HYBRID -BIOCOMPOSITE* ZnO/KITOSAN UNTUK APLIKASI PENANGANAN METILEN BIRU SECARA FOTOKATALISIS

Baterai yang banyak digunakan yaitu Zn-C, namun ketika habis baterai ini tidak dapat digunakan kembali ,sehingga menjadi ancaman bagi lingkungan karena beberapa komponennya termasuk dalam limbah B3. Diperlukan pengolahan pada limbah ini. Zn dapat diolah menjadi semikonduktor ZnO, untuk meningkatkan kemampuan fotokatalitiknya ZnO dicampurkan dengan kitosan yang dapat bekerja sebagai penghilang senyawa fenolik karena memiliki gugus NH_2 dan OH^-, dapat mengomplekskan ion Zn dari ZnO, dan kemudian memodifikasi struktur elektro icnya sehingga peka terhadap iradiasi yang terlihat. Pada penelitian ini dilakukan sintesis *Hybrid-biocomposite* ZnO/Kitosan 1:1, 1:2, dan 2:1 yang diaplikasikan untuk degradasi metilen biru dengan metode fotokatalisis. Gugus fungsi ditentukan dari renggangan pita hasil FTIR dimana ketiga sampel memiliki renggangan pita yang sama dengan standar kitosan yaitu terlihat gugus fungsi utama NH_2 dan OH^- dimana pada variasi 1:2 memiliki renggangan pita paling panjang didaerah sidik jari yang menunjukan terjadinya interaksi kuat dengan ZnO. Hasil karakterisasi dengan UV-DRS menunjukan nilai *band gap* masing-masing 3,26, 3,32, dan 3,30 eV . Degradasi metilen biru secara fotokatalisis dilakukan dengan variasi massa *Hybrid-biocomposite* ZnO/Kitosan, waktu kontak penyinaran, dan konsentrasi metilen biru. Pada massa 50 mg dalam 10 mL larutan metilen biru 5 ppm selama 180 menit nilai % dekolorisai terbaik dimiliki oleh *Hybrid-biocomposite* ZnO/Kitosan 1:2 yaitu sebesar 94,51%.

Kata Kunci : Fotokatalisis, *Hybrid-biocomposite* ZnO/Kitosan, kitosan, limbah baterai Zn-C, metilen biru.

ABSTRACK

SYNTHESIS AND CHARACTERIZATION OF HYBRID -BIOCOMPOSITE ZnO/CHITOSAN FOR APPLICATIONS METHYLENE BLUE HANDLING WITH PHOTOCATALYSIS

The battery that is widely used is Zn-C, but when it runs out this battery cannot be reused, so it becomes a threat to the environment because some of its components are included in B3 waste. Treatment of this waste is required. Zn can be processed into a ZnO semiconductor, to increase its photocatalytic ability ZnO is mixed with chitosan which can work as a phenolic compound remover because it has NH2 and OH- groups, can complex the Zn ion of ZnO, and then modify its electro ic structure so that it is sensitive to visible irradiation. In this study, the synthesis of Hybrid-biocomposite ZnO/Chitosan 1:1, 1:2, and 2:1 was applied for the degradation of methylene blue by the photocatalytic method. The functional group was determined from the FTIR band gap where the three samples had the same band stretch as the chitosan standard, namely the main functional groups were NH2 and OH- where in variation 1: 2 has the longest stretch of band in the fingerprint area which indicates a strong interaction with ZnO. The results of characterization with UV-DRS showed that the band gap values were 3.26, 3.32, and 3.30 eV, respectively. Photocatalytic degradation of methylene blue was carried out with variations in the mass of Hybrid-biocomposite ZnO/Chitosan, irradiation contact time, and methylene blue concentration. At a mass of 50 mg in 10 mL of 5 ppm methylene blue solution for 180 minutes the best % decolorization value was owned by Hybrid-biocomposite ZnO/Chitosan 1:2 which was 94.51%. and the concentration of methylene blue. At a mass of 50 mg in 10 mL of 5 ppm methylene blue solution for 180 minutes the best % decolorization value was owned by Hybrid-biocomposite ZnO/Chitosan 1:2 which was 94.51%. and the concentration of methylene blue. At a mass of 50 mg in 10 mL of 5 ppm methylene blue solution for 180 minutes the best % decolorization value was owned by Hybrid-biocomposite ZnO/Chitosan 1:2 which was 94.51%.

Keywords : Photocatalysis, Hybrid-biocomposite ZnO/Chitosan, chitosan, Zn-C battery waste. methylene blue.