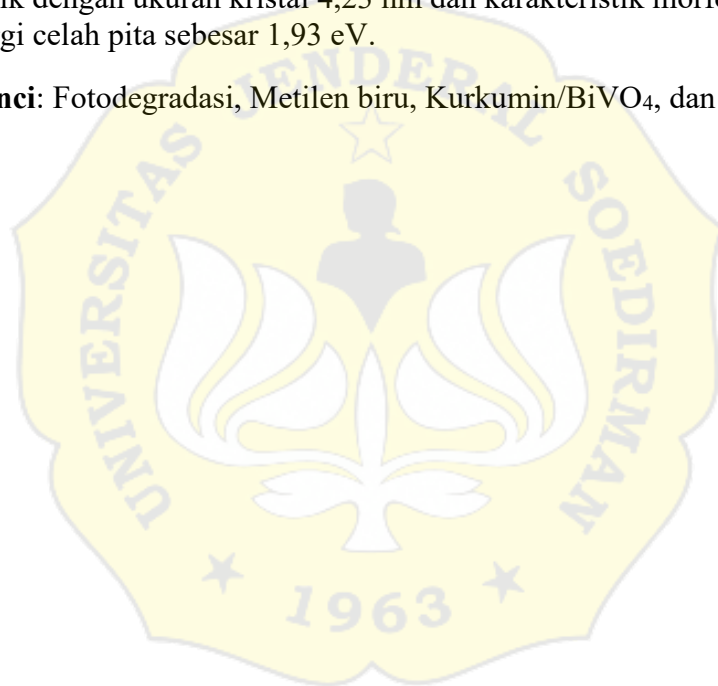


ABSTRAK

Degradasi metilen biru (MB) dilakukan dengan metode fotokatalisis menggunakan material komposit kurkumin/ BiVO_4 dengan sinar visibel sebagai sumber energi. Penelitian ini bertujuan untuk mengkaji karakteristik dan aktivitas fotokatalitik melalui variasi konsentrasi, waktu degradasi, dan pH metilen biru. Selain itu, laju kinetika reaksi dan mekanisme degradasi fotokatalitik juga dianalisis. Karakterisasi material dilakukan menggunakan teknik XRD, SEM, FTIR, dan UV-Vis DRS. Hasil yang diperoleh menunjukkan bahwa komposit kurkumin/ BiVO_4 dengan variasi konsentrasi 1:1 pada pH 3 metilen biru dengan waktu degradasi 210 menit mampu mendegradasi metilen biru hingga 99,77%. Laju kinetika fotokatalitik mengikuti orde satu dengan radikal hidroksil ($\bullet\text{OH}$) sebagai spesies utama dalam mekanisme degradasi. Struktur kristal kurkumin/ BiVO_4 menunjukkan fase monoklinik dengan ukuran kristal 4,23 nm dan karakteristik morfologi *sphere like*, serta energi celah pita sebesar 1,93 eV.

Kata Kunci: Fotodegradasi, Metilen biru, Kurkumin/ BiVO_4 , dan kurkumin.



ABSTRACT

The degradation of methylene blue (MB) was carried out by photocatalysis method using curcumin/BiVO₄ composite material with visibel light as energy source. This study aims to assess the characteristics and photocatalytic activity through variations in concentration, degradation time, and pH of methylene blue. In addition, the rate of reaction kinetics and photocatalytic degradation mechanism were also analyzed. Material characterization was performed using XRD, SEM, FTIR, and UV-Vis DRS techniques. The results obtained showed that the curcumin/BiVO₄ composite with a concentration variation of 1:1 at pH 3 of methylene blue with a degradation time of 210 minutes was able to degrade methylene blue up to 99,77%. The rate of photocatalytic kinetics follows first order with hydroxyl radical ($\bullet\text{OH}$) as the main species in the degradation mechanism. The crystal structure of curcumin/BiVO₄ shows a monoclinic phase with a crystal size of 4,23 nm and a characteristic sphere-like morphology, as well as a band gap energy of 1,93 eV.

Keywords: Photodegradation, Methylene blue, Curcumin/BiVO₄, and curcumin.

