

ABSTRAK

Rotua Fetricia Silitonga, NIM 4173240011 (2022). Pengaruh Suhu *Pre-Heating* Terhadap Mikrostruktur dan Sifat Optik Film Tipis ZnO dengan Metode Sol-Gel *Spin Coating*.

Telah berhasil dilakukan pembuatan film tipis ZnO dengan variasi suhu *pre-heating* (150°C , 175°C , 200°C , 225°C dan 250°C) dengan menggunakan metode sol-gel *spin coating*. Film tipis ZnO dikarakterisasi dengan XRD, SEM-EDS, UV-Vis, dan FTIR. Hasil karakterisasi XRD menunjukkan bahwa struktur kristal semua sampel berbentuk *wurtzite hexagonal* dengan ukuran kristal berturut-turut 23,8, 19,4; 23,4 ; 25,1 dan 25,2 nm. Analisis SEM menunjukkan distribusi partikel yang menutupi substrat tanpa *crack* dan hasil EDS mengonfirmasi keberadaan unsur-unsur Zn dan O. Hasil karakterisasi spektrofotometri UV-Vis semua sampel menunjukkan nilai absorbansi yang menurun tajam dan nilai transmitansi yang meningkat tajam pada rentang panjang gelombang 350-400 nm. Nilai transmitansi tertinggi pada daerah cahaya tampak yaitu 82,3% pada suhu *pre-heating* 250°C . Lebar celah pita energi berturut-turut 3,267; 3,259; 3,258; 3,257 dan 3,256 eV. Hasil karakterisasi FTIR menunjukkan terbentuknya ikatan Zn-O pada semua sampel berturut-turut pada bilangan gelombang $574,79\text{ cm}^{-1}$; $570,92\text{ cm}^{-1}$; $576,22\text{ cm}^{-1}$; $574,79\text{ cm}^{-1}$ dan $574,79\text{ cm}^{-1}$.

Kata Kunci: *Film tipis ZnO, metode sol-gel spin coating, pre-heating*



ABSTRACT

Rotua Fetricia Silitonga, NIM 4173240011 (2022). The Effects of Pre-heating Temperature on Microstructural and Optical Properties of ZnO Thin Film with Sol-Gel Spin Coating.

The fabrication of ZnO thin films with various pre-heating temperatures (150⁰C, 175⁰C, 200⁰C, 225⁰C and 250⁰C) had been done using the sol-gel spin coating method. ZnO thin films were characterized by XRD, SEM-EDS, UV-Vis, and FTIR. The results of XRD characterization showed that the crystal structure of all samples was in the form of hexagonal wurtzite with crystal sizes of 23.8, 19.4, 23.4 ; 25.1 and 25.2 nm, respectively. SEM analysis showed the distribution of particles covering the substrate without cracks and EDS results confirmed the presence of Zn and O elements. UV-Vis spectrophotometer characterization results for all samples showed a sharp decrease in absorbance value and a sharp increase in transmittance value in the wavelength range of 350-400 nm. The highest transmittance value in the visible light region is 82,3% at a pre-heating temperature of 250⁰C. The energy band gap is 3,267, respectively; 3,259; 3,258; 3,257 and 3,256 eV. FTIR showed the formation of Zn-O characters in all samples successively at a wavenumber of 574.79 cm⁻¹; 570.92 cm⁻¹; 576.22 cm⁻¹; 574.79 cm⁻¹ dan 574.79 cm⁻¹.

Keywords: ZnO thin film, sol-gel spin coating method, pre-heating

