

ABSTRACT

ANALYSIS OF CHARGE CARRIER INTERACTION WITH MAGNETIC FIELD ON THE Fe(III)-MESOPORPHYRIN IX CHLORIDE THIN LAYERS DEPOSITED BY SPIN COATING

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In this study, the Fe(III)-Mesoporphyrin IX chloride thin layers have been successfully deposited by spin coating method at room temperature and atmospheric conditions on Indium Doped Tin Oxide-coated glass substrates, PCB Cu substrates and CoPd-coated glass substrates. Variations of layer thickness of Fe(III)-Mesoporphyrin IX chloride were done by modifying the rotational speed and the concentration of the solution. Then the thin layers were morphologically characterized by using Atomic Force Microscopy and electrically properties by using *I-V* measurements. The experimental results demonstrated that a discrete nano-particle islands structures of Fe(III)- Mesoporphyrin IX chloride layers were observed. Both the number of nano-islands and thickness of the layer significantly increased with increasing concentration. The higher number of islands was obtained for a lower spinning speed. In case of electrical properties, ohmic characteristics were obtained. The measurement of the *I-V* characteristics under magnetic field indicated that the current decreased with the increase in the magnetic field. The current show a relatively constant at a given magnetic fields. Here, the current reduction can be attributed to the recombination of charge carriers under magnetic fields. Futhermore, it was found that the saturated current increased with the increase in the applied voltage.

Keywords : Fe(III)- Mesoporphyrin IX chloride, Surface Morphology, Atomic Force Microscopy

INTISARI

ANALISIS INTERAKSI PEMBAWA MUATAN DENGAN MEDAN MAGNET PADA LAPISAN TIPIS Fe(III)-MESOPORPHYRIN IX CHLORIDE HASIL DEPOSISI SPIN COATING

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Pada penelitian ini lapisan tipis *Fe(III)-Mesoporphyrin IX chloride* telah berhasil dideposisikan dengan metode *spin coating* pada suhu kamar dan tekanan atmosfer ruang di atas substrat kaca berlapis ITO (*Indium Doped Tin Oxide*), substrat lapisan Cu PCB (*Printed Circuit Boards*) dan substrat kaca CoPd. Variasi lapisan *Fe(III)-Mesoporphyrin IX chloride* dilakukan dengan modifikasi kecepatan putar 500 rpm dan 1000 rpm, serta konsentrasi larutan. Kemudian morfologi lapisan dikarakterisasi dengan menggunakan *Atomic Force Microscopy* (AFM) dan sifat kelistrikan dengan pengukuran *I-V*. Hasil eksperimen menunjukkan bahwa suatu struktur nano partikel pulau-pulau diskrit telah berhasil diamati, baik pada substrat kaca berlapis ITO (*Indium Doped Tin Oxide*), substrat lapisan Cu PCB (*Printed Circuit Boards*) maupun substrat kaca CoPd. Jumlah dan ketebalan pulau-pulau (*island*) partikel meningkat secara signifikan dengan kenaikan konsentrasi. Sementara itu, jumlah terbanyak pulau-pulau partikel orde nanometer diperoleh untuk kecepatan putar 500 rpm. Untuk sifat kelistrikan, telah diperoleh karakteristik *ohmic*. Pengukuran karakteristik *I-V* di bawah medan magnet memperlihatkan bahwa arus menurun dengan kenaikan medan magnet. Selanjutnya, arus menunjukkan nilai relatif konstan setelah medan tertentu. Penurunan arus tersebut dapat dikaitkan dengan rekombinasi pembawa muatan akibat perlakuan medan magnet. Lebih dari itu, ditemukan pula bahwa nilai arus jenuh meningkat dengan peningkatan tegangan.

Kata kunci : *Fe(III)-Mesoporphyrin IX chloride*, Morfologi permukaan, *Atomic Force Microscopy* (AFM).