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Electrical conductivity of chlorophyll with polythiophene thin film on indium tin oxide as P-N heterojunction solar cell /
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PENGAKUAN DAN PENGESAHAN LAPORAN PITA I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:.....

ELECTRICAL CONDUCTIVITY OF CHLOROPHYLL WITH POLYTHIOPHENE TIN FILM ON
INDIUM TIN OXIDE AS P-N HETEROJUNCTION SOLAR CELL

oleh.. FAKHANAH LYANA BINTI MOHAMAD RASUL.....,no. matrik: ..UK 11376.....

telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Fizik sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah ..SM. SN. GUNAAN (FIZIK ELEKTRONIK & INSTRUMENTASI) Fakulti Sains dan Teknologi, UMT.

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DECLARATION

I hereby declare that this thesis entitled Electrical Conductivity of Chlorophyll with Polythiophene Thin Film on Indium Tin Oxide as P-N Heterojunction Solar Cell is the result of my own research except as cited in the references.

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ABSTRACT

This work was focused on the study of electrical conductivity to the combination of Polythiophene thin film (PT) and Chlorophyll thin film (CHLO) by layered on Indium Tin Oxide substrate (ITO) as p-n heterojunction solar cell. Polythiophene thin film is deposited to the ITO substrate by using electrochemistry method. Chlorophyll thin film is coated on Polythiophene thin film by using the spin coating method. Current and voltage of ITO/PT/CHLO thin film is measured in the dark and under different light intensity by using the four point probe. The result shows that Polythiophene thin film is successfully coated with Chlorophyll on ITO substrate with different thicknesses. Electrical conductivity in the dark showed an increasing with the increasing of Polythiophene thin film thickness. While, with the increasing of Chlorophyll thin film thickness, electrical conductivity in the dark is consecutively change. Electrical conductivity under different intensity of light increased with the increasing of light intensity. Electrical conductivity under intensity of light are diminished with the increasing of Polythiophene thin film thickness. While electrical conductivity is increase with the increasing of the light intensity and the increasing of Chlorophyll thin film thickness. In conclusion, combination of the thinnest Polythiophene thin film with the thickest Chlorophyll thin film produce the highest electrical conductivity reach up to $\pm 0.1 \text{ Sm}^{-1}$ (raise 22% under illumination compared to the electrical conductivity in the dark condition). This study is suitable to generate a solar cell.

ABSTRAK

Fokus kajian ini adalah untuk mengkaji kekonduksian elektrik pada gabungan filem nipis Politiofena (PT) dan filem nipis Klorofil (CHLO) secara berlapisan di atas substrak Indium Timah Oksida (ITO) sebagai simpangan hetero p-n sel suria. Filem nipis Politiofena dimendapkan ke substrak ITO dengan menggunakan kaedah elektrokimia. Filem nipis Klorofil dilapisi di atas Politiofena dengan menggunakan kaedah penyalutan berputar. Arus dan voltan filem nipis ITO/PT/CHLO diukur dengan menggunakan kaedah penduga empat titik dalam gelap dan dibawah keamatan cahaya yang berbeza-beza. Hasil kajian ini menunjukkan bahawa filem nipis Politiofena berjaya dilapisi dengan Klorofil di atas substrak ITO dengan ketebalan yang berbeza-beza. Kekonduksian elektrik dalam gelap menunjukkan peningkatan dengan pertambahan ketebalan filem nipis Politiofena. Manakala, dengan pertambahan ketebalan Klorofil, kekonduksian elektrik dalam gelap menunjukkan perubahan yang tidak seragam. Kekonduksian elektrik dalam keamatan cahaya menunjukkan peningkatan dengan pertambahan keamatan cahaya. Kekonduksian elektrik dalam cahaya adalah berkurang dengan pertambahan ketebalan filem nipis Politiofena. Manakala kekonduksian elektrik adalah meningkat dengan pertambahan cahaya dan pertambahan ketebalan filem nipis Klorofil. Kesimpulannya, gabungan filem nipis yang paling nipis daripada Politiofena dengan filem nipis Klorofil yang tebal menghasilkan kekonduksian elektrik yang paling tinggi iaitu $\pm 0.1 \text{ Sm}^{-1}$ (meningkat sebanyak 22% dibawah cahaya berbanding kekonduksian elektrik dalam keadaan gelap). Kajian ini adalah sesuai untuk menghasilkan sel solar.