

PRELIMINARY STUDY OF HALL EFFECT OF
CHLOROPHANE AND POLYMERIZABLE THIN
FILM ON AND ON TIN OXIDE

MAR LAL YOOH

FACULTY OF SCIENCE AND TECHNOLOGY
UNIVERSITI MALAYSIA TERENGGANU

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PERPUSTAKAAN SULTANAH NUR ZAHIRAH
UNIVERSITI MALAYSIA TERENGGANU (UMT)
21030 KUALA TERENGGANU

1100070817

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HAK MILIK
PERPUSTAKAAN SULTANAH NUR ZAHIRAH UMT

PRELIMINARY STUDY OF HALL EFFECT OF CHLOROPHYLL WITH
POLYPYRROLE THIN FILM ON INDIUM TIN OXIDE

By
Yap Lai Yoon

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DEPARTMENT OF PHYSICAL SCIENCES
FACULTY OF SCIENCE AND TECHNOLOGY
UNIVERSITY MALAYSIA TERENGGANU
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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **Preliminary Study of Hall Effect of Chlorophyll with Polypyrrole Thin Film on Indium Tin Oxide** oleh **Yap Lai Yoon**, no. matrik: **UK 13207** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Fizik sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah Sarjana Muda Sains Gunaan (Fizik Elektronik & Instrumentasi), Fakulti Sains dan Teknologi, UMT.

Disahkan oleh:

Penyelia Utama **PROF. MADYA DR. SALLEH HARUN**
Nama: *Dr. Salleh Harun* Pensyarah
Cop Rasmi: **Jabatan Sains Fizik
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu**

Tarikh: *20/6/09*

Penyelia Bersama (jika ada) **DR. CHAN KOK SHENG**
Nama: *Dr. Chan Kok Sheng* Pensyarah
Cop Rasmi: **Jabatan Sains Fizik
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu**

Tarikh: *29/4/2009*

Ketua Jabatan Sains Fizik
Nama: **DR. MOHD IKMAR MIZAN BIN MOHAMAD ISA**
Cop Rasmi: **Head
Department of Physical Sciences
Faculty of Science and Technology
University Malaysia Terengganu
21030 Kuala Terengganu**

Tarikh: *29/4/09*

DECLARATION

I hereby declare that this thesis entitle Preliminary study of Hall Effect of Chlorophyll with Polypyrrole Thin Film on Indium Tin Oxide is the result of my own research except as cited in the references.

Signature :

Name : Yap Lai Yoon

Matrix No: UK 13 207

Date : 29 April 2009

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PRELIMINARY STUDY OF HALL EFFECT OF CHLOROPHYLL WITH POLYPYRROLE THIN FILM ON INDIUM TIN OXIDE

ABSTRACT

This work is the preliminary study of Hall Effect of chlorophyll with polypyrrole thin film on Indium Tin Oxide. The chlorophyll and polypyrrole was deposited on the Indium Tin Oxide (ITO) substrate by using the spin coater machine. Four kind of sample which are Indium Tin Oxide without thin film, Indium Tin Oxide with 5 layers of thin film, Indium Tin Oxide with 10 layers of thin film and Indium Tin Oxide with 15 layers of thin film. Each kind of the sample prepared with 4 duplicates. The conductivity had been check with the Four Point Probe (FPP) method. From the Four Point Probe study the resistivity values is decrease due to increase of number of the thin film. For the conductivity of Indium Tin Oxide with thin film is increase after coated with the thin film. Meanwhile, for the conductivity of thin film, it is decrease due to the number of the thin film. In another words, chlorophyll and polypyrrole is not suitable to act as the thin film in the Hall Effect measurement. The thickness of the thin film is measured by using the Scanning Electron Microscope (SEM). The value of thickness of thin film for each layer is in the range 2.88 μm to 5.6 μm . This study is using the Hall Effect machine to determine the connection between 4 point, Sheet carrier Density, Hall Voltage, Hall Mobility and Sheet resistivity. The result of all the measurement is showing the characteristic of the sample 5 which contain the 5 layers of thin film and sample 13 which contain 15 layers of thin film. Before measure the Hall Effect value, connection has to be check by using the Hall Effect machine. The connection of sample 5 is good compare with the sample 13 which might contain wire broken. From the result we get from the Hall Effect machine, we can conclude that the chlorophyll and polypyrrole is not suitable to be the thin film for the Hall Effect because the chlorophyll will reduces the conductivity due to the thickness. However, Indium Tin Oxide is a suitable substrate for Hall Effect because the conductivity and the resistivity are in the range that can measure by the Hall Effect.

KAJIAN PERMULAAN BAGI KESAN HALL BAGI KLOORIFIL DENGAN FILEM NIPIS POLYPYRROLE PADA INDIUM TIN OKSIDA

ABSTRAK

Kerja ini adalah kajian permulaan bagi Hall Effect klorofil dengan polypyrrole filem nipis pada Indium Tin Oxide. Klorofil dan polypyrrole sedang dilonggokkan atas Indium Tin Oxide (ITO) substrat dengan menggunakan pusingan coater mesin. Empat jenis bagi sampel yang adalah tanpa Indium Tin Oxide filem nipis, Indium Tin Oxide dengan 5 lapisan filem nipis, Indium Tin Oxide dengan 10 lapisan filem nipis dan Indium Tin Oxide dengan 15 lapisan filem nipis. Setiap jenis bagi sampel berlengkapkan 4 salinan. Kekonduksian diperiksa dengan Four Point Probe (FPP) kaedah. Daripada kajian Four Point Probe kerintangan nilai-nilai mengurangkan akibat meningkatkan nombor bagi filem nipis. Kekonduksian Indium Tin Oxide dengan filem nipis meningkatkan selepas bersalut dengan filem nipis. Sementara itu, untuk kekonduksian filem nipis, ia adalah mengurangkan bersama dengan peningkatan jumlah lapisan bagi filem nipis. Dalam satu lagi kalimah, klorofil dan polypyrrole adalah tidak bersesuaian untuk bertindak sebagai filem nipis dalam ukuran Hall Effect. Ketebalan filem nipis diukur dengan menggunakan Mikroskop Elektron Pensakan (SEM). Nilai ketebalan bagi filem nipis untuk setiap satu lapisan berada dalam julat 2.88 μm dan 5.6 μm . Kajian ini menggunakan mesin Hall Effect untuk menentukan sambungan antara 4 titik, Sheet Carrier Density, Hall Voltage, Hall Mobility dan Sheet Resistivity. Hasil semua ukuran sedang menunjuk ciri-ciri sampel 5 yang mengandungi 5 lapisan filem nipis dan sampel 13 yang mengandungi 15 lapisan filem nipis. Sebelum mengukur nilai Hall Effect, sambungan perlu semakan dengan menggunakan mesin Hall Effect. Sambungan sampel 5 adalah perbandingan yang bagus dengan sampel 13 yang mungkin mengandungi putusan dawai. Daripada hasil kita mendapat daripada mesin Hall Effect, kita dapat menyimpulkan bahawa klorofil itu dan polypyrrole adalah tidak bersesuaian menjadi filem nipis untuk Hall Effect kerana klorofil akan mengurangkan kekonduksian itu akibat ketebalan. Bagaimanapun, Indium Tin Oxide adalah satu substrat sesuai untuk Hall Effect kerana kekonduksian dan kerintangan adalah dalam julat yang dapat mengukur oleh Kesan Hall.