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A STUDY OF STRUCTURAL AND PHYSICAL PROPERTIES
OF POLYVINYL ALCOHOL (PVA) THIN
FILM

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A project report submitted in partial fulfillment
of the requirement for the award of the degree of
Bachelor of Applied Science (Physics Electronic and Instrumentation)

DEPARTMENT OF PHYSICAL SCIENCES
FACULTY OF SCIENCE AND TECHNOLOGY
UNIVERSITY MALAYSIA TERENGGANU

2008



**JABATAN SAINS FIZIK
FAKULTI SAINS DAN TEKNOLOGI
UNIVERSITI MALAYSIA TERENGGANU**


PENGAKUAN DAN PENGESAHAN LAPORAN PITA I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk : **A STUDY OF STRUCTURAL AND PHYSICAL PROPERTIES OF POLYVINIL ALCOHOL (PVA) THIN FILM** oleh **NAIMAH BINTI ISAMIL**, no. matrik: **UK12416** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Fizik sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains Gunaan (Fizik Elektronik & Instrumentasi) Fakulti Sains dan Teknologi, UMT.

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DECLARATION

I hereby declare that this thesis entitled A Study of Structural and Physical Properties of Polyvinyl Alcohol (PVA) Thin Film is the result of my own research except as cited in the references.

Signature : 

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With the name of ALLAH, I am so grateful because of His allowance I finally finished my final year project entitled a study of structural and physical properties of polyvinyl alcohol (PVA) thin film.

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ABSTRACT

The purpose of this research was to study the structural and physical properties of polyvinyl alcohol (PVA) thin film. The thin films morphology was characterized by scanning electron microscope (SEM) and Fourier Transform Infrared (FTIR) spectroscopy. For SEM, the morphology of PVA powders and thin film has being measured. After that, we were also being evaluated powder for comparison to the thin film. FTIR is most useful for identifying chemicals. FTIR spectra of the thin film indicated complete esterification of the free carboxylic groups of distilled water. The PVA powder was also measured by using FTIR as comparison to the thin film. The mechanical properties of the thin films were characterized by tensile tests and hardness test. The comparison of tensile test and hardness is indicated with commercial plastic. The comparison of the width of thin film, the tensile give different reading. When width increases, the tensile strength also increases. The hardness is increase when width increase and we have found that the thin film is smooth than commercial plastic. PVA structural and physical properties suggested being test by various instruments like XRD, XRD, hemocompatibility test, and viscosity measurement, DSC thermogram characterization to get more accurate result and to know more application of it. The experimental results indicated that the PVA thin film could be tried for various applications.

ABSTRAK

Tujuan utama kajian ini dijalankan ialah untuk mengkaji struktur dan sifat-sifat fizik tentang polyvinyl alkohol (PVA) bagi filem nipis. Struktur filem nipis di uji dengan menggunakan SEM sementara struktur bagi serbuk PVA juga di nilai untuk sebagai perbandingan terhadap struktur filem nipis. FTIR alat yang digunakan untuk mengenalpasti jenis ikatan kimia sesuatu bahan. Spektra FTIR menunjukkan pengesteran yang lengkap mengenai kumpulan karbolik bebas daripada air suling. Struktur bagi serbuk juga diuji dengan menggunakan FTIR sebagai rujukan terhadap sampel sebenar. Sifat mekanikal bagi filem nipis ditentukan dengan menggunakan mesin ketegangan dan juga mesin kekerasan. Perbandingan antara ujian ketegangan dan ujian kekerasan filem nipis ditunjukkan dengan plastic komersial. Perbezaan terhadap ketebalan filem nipis memberikan bacaan ketegangan yang berbeza-beza. Semakin tebal filem nipis, ketegangan juga bertambah. Nilai bacaan kekerasan juga bertambah apabila tebal filem nipis bertambah dan didapati filem nipis adalah lebih lembut berbanding komersial plastik. Struktur dan sifat-sifat fizik bagi PVA dicadangkan uji dengan pelbagai lain alat seperti XRD, pengukuran kelikatan dan banyak lagi untuk mendapat keputusan yang lebih tepat dan boleh diaplikasikan terhadap banyak perkara. Keputusan yang diperolehi melalui kajian ini menunjukkan PVA boleh diaplikasikan dalam banyak perkara.