

SYNTHESIS AND CHARACTERIZATION OF  
POLY(BIPHENYLENE ACETIC ACID) AS A CONDUCTING  
POLYMER IN THE PRESENCE OF SURFACTANTS

ABSTRACT

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SYNTHESIS AND CHARACTERIZATION OF  
POLY (3-THIOPHENE ACETIC ACID) AS A CONDUCTING POLYMER  
IN THE PRESENCE OF SURFACTANTS

BY

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## LIST OF ABBREVIATIONS

3-TAA	3-Thiophene acetic acid
SDS	Sodium Dodecyl Sulfate
DBSNA	Sodium Dodecyl benzene sulfonate
ITO	Indium-tin oxide
UV-Vis	Ultraviolet visible
SEM	Scanning electron microscopy
FTIR	Fourier Transform-infrared
DSC	Differential scanning calorimetry
LEDs	Light Emitting Diodes
FeCl <sub>3</sub>	Ferric chloride
$\epsilon$	Electron charge
$\mu$	Mobility of charge carriers
$\sigma$	Conductivity
$\rho$	Resistivity
nm	Nanometer
Abs.	Absorption
I	Current
mA	milli-Ampere
V	Voltage
S	distance between two point

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## ABSTRACT

Poly (3-thiophene acetic acid) or P3TAA was synthesized via an oxidation polymerization in the presence of surfactant. Anionic surfactant that has been introduced in this study was Sodium Dodecyl Sulfate. The SDS doped P3TAA form longer conjugated system, possess higher conductivity, higher thermal stability and better solubility. The polymerization process was carried out in aqueous medium containing oxidant and SDS as the dopant. Result of the FT-IR analysis shows the shifting of the absorption frequency and proved that SDS was incorporated into P3TAA as the doping anion. UV-Vis analysis studies showed that the presence of SDS increased the length of the prepared P3TAA. Also, thermal stability, checked by TGA in nitrogen, was improved. Polarized light microscopic studies showed that the morphology of P3TAA prepared were influence by the presence of SDS. The conductivity of P3TAA was tested by using the V-I circuit. The result showed that the conductivity of SDS doped P3TAA has increased. Solubility and processibility of P3TAA prepared in the presence of SDS was improved. The studies showed that the properties of P3TAA prepared are better then P3TAA without SDS.

## **Sintesis dan Pencirian Poli (3-Thiophene acid asetik) sebagai Polimer Pengalir dengan kehadiran Surfaktant**

### **ABSTRAK**

Poli (3-tiopena acid asetik) telah disintesis dengan menggunakan pempolimeran-pengoksidaan dengan kehadiran surfaktan anionik. Surfaktan yang digunakan adalah "Sodium Dodecyl Sulfate". P3TAA yang ditambah dengan SDS membentuk sistem berconjugat yang lebih panjang, kekonduksian yang lebih tinggi, kestabilan terma yang lebih tinggi dan keterlarutan yang baik. Proses pempolimeran telah dijalankan dalam medium akuas yang mengandungi oksidant dan SDS sebagai dopan. Keputusan analisa FT-IR telah menunjukkan pengagihan frekuensi dan bukti bahawa SDS telah bergabung dengan P3TAA sebagai dopan anion. Analisa UV-Vis menunjukkan bahawa kehadiran SDS telah meningkatkan ukuran P3TAA yang disediakan. Kestabilan terma diukur dengan TGA dengan kehadiran nitrogen dan menunjukkan kestabilan yang meningkat. Morfologi permukaan P3TAA menunjukkan perubahan dengan kehadiran SDS. Selain daripada itu, kekonduksian dan kelarutan polymer yang disediakan menunjukkan P3TAA yang disediakan mempunyai perubahan yang jelas. Maka, ini menunjukkan P3TAA yang disediakan mempunyai sifat yang lebih baik berbanding dengan P3TAA tanpa SDS.