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ศูนย์วิทยทรัพยากร  
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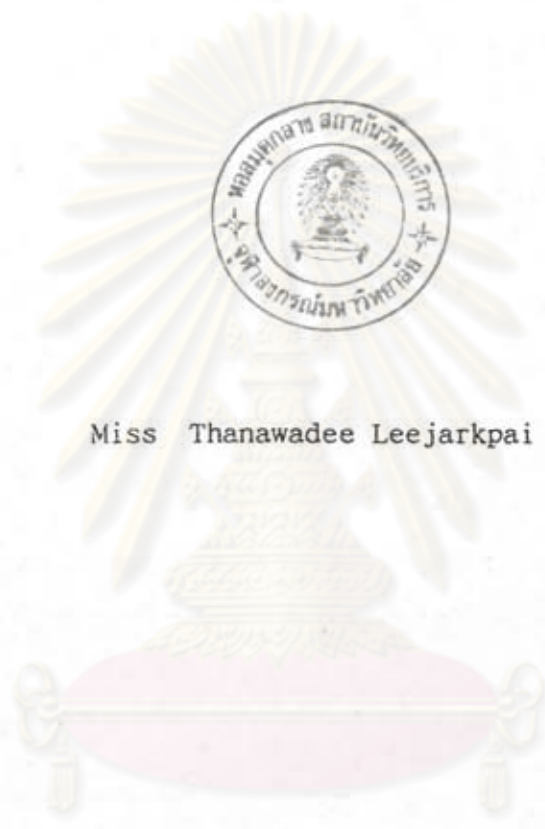
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SYNTHESIS OF ELECTRICAL CONDUCTING POLYMER  
BY SOLUTION POLYMERIZATION



Miss Thanawadee Leejarkpai

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จุฬาลงกรณ์มหาวิทยาลัย  
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By                      Miss Thanawadee Leejarkpai  
Department        Petro-Polymer Interprogram  
Thesis Advisor    Associate Professor Supawan Tantayanon,  
                         Ph.D.  
Thesis Co-advisor Associate Professor Anantasin Techagumpuch,  
                         Ph.D.



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Accepted by the Graduate School, Chulalongkorn  
University in Partial Fulfillment of the Requirements for a  
Master's Degree.

*Supawan Tantayanon*  
..... Dean of Graduate School  
(Professor Thavorn Vajrabhaya, Ph. D.)

Thesis committee

*K. Sukanjanattee*  
..... Chairman  
(Associate Professor Kroekchai Sukanjanattee, Ph.D.)  
*Supawan Tantayanon*  
..... Thesis Advisor  
(Associate Professor Supawan Tantayanon, Ph.D.)  
*Anantasin Techagumpuch*  
..... Thesis Co-advisor  
(Associate Professor Anantasin Techagumpuch, Ph.D.)  
*Amorn Petsom*  
..... Member  
(Associate Professor Amorn Petsom, Ph.D.)  
*Naunphun Chantarasi*  
..... Member  
(Naunphun Chantarasi, Ph.D.)  
*Sujitra Dhumrongvaraporn*  
..... Member  
(Sujitra Dhumrongvaraporn, Ph.D.)

พิมพ์ต้นฉบับบทคัดย่อวิทยานิพนธ์ภายในกรอบสี่เหลี่ยมนี้เพียงแผ่นเดียว

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ได้ทำการสังเคราะห์โพลิไพโรลโดยวิธีการทางเคมี โดยใช้เฟอร์ริกคลอไรด์เป็นตัวออกซิไดซ์  
จากการทดลองพบว่าเมทานอลเป็นตัวทำละลายที่เหมาะสมในการสังเคราะห์โพลิไพโรล และสภาวะที่  
เหมาะสมในการสังเคราะห์โพลิไพโรล ให้มีค่าการนำไฟฟ้าสูง คือความเข้มข้นของเฟอร์ริกคลอไรด์  
2.5 M เวลาที่ใช้ในการสังเคราะห์ 20 นาที ที่อุณหภูมิ 0 °C และจากการเปลี่ยนแปลงชนิดของตัว  
ทำละลาย พบว่าค่าออกซิเคชันโพเทนเชียลเริ่มต้นของสารละลาย ที่เหมาะสมในการสังเคราะห์โพลิ-  
ไพโรลคือ 608 mV จากการศึกษาเกี่ยวกับสภาพการนำไฟฟ้า พบว่าเวลา, อุณหภูมิ, ความเป็นกรด-  
เบส ของสารละลาย และความชื้นในอากาศ มีผลทำให้สภาพการนำไฟฟ้าของโพลิเมอร์ลดลง นอกจากนี้  
นี่ยังได้ทำการสังเคราะห์ โพลิไทโอเฟน และอนุพันธ์ ด้วยวิธีเดียวกัน พบว่า อะซิโตรไนโตรเหมาะสมใน  
การสังเคราะห์ โพลิเมอร์นี้ให้มีค่าการนำไฟฟ้าสูง



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

ภาควิชา.....  
สาขาวิชา.....  
ปีการศึกษา.....

ลายมือชื่อนิสิต.....  
ลายมือชื่ออาจารย์ที่ปรึกษา.....  
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....



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KEY WORD: ELECTRICAL CONDUCTING POLYMER/ POLYPYRROLE/ POLYTHIOPHENE

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Polypyrrole has been prepared by chemical polymerization using ferric chloride solution in several different solvents. It is found that methanol is the best solvent for polymerization of pyrrole. The suitable condition was sought in order to achieve a high conducting polymer. This was the reaction of 2.5 M  $\text{FeCl}_3$  in MeOH at  $0^\circ\text{C}$  for 20 minutes reaction time. It was also observed that type of solvent of  $\text{FeCl}_3$  solution was not significant as long as the solution had the appropriate oxidation potential which was 608 mV. Under this condition the synthesized polypyrrole shows high electrical conductivity. The conductivity of polypyrrole was gradually dropped with time and temperature. It was also decreased when stored in acid/base solution or kept in contact with moisture. Polythiophene and poly(3-methylthiophene) were similarly prepared. However, they exhibit the highest electrical conductivity when acetonitrile is used as the solvent.



ภาควิชา.....สหสาขาวิชาเทคโนโลยี-โพลิเมอร์.....

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## ABBREVIATIONS

Å	angstrom
σ	Conductivity
FTIR	Fourier Transform Infrared
g	gram
IR	Infrared
μm	micrometer
mV	milivolt
ml	millilitre
min	minute
π	Pi
P3MT	Poly(3-methylthiophen)
PP	Polypyrrole
PT	Polythiophene
SEM	Scaning electron microscopy
S	Semens
σ	Sigma
ν	Wavenumber

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