

ห้องสมุดงานวิจัย สำนักงานคณะกรรมการวิจัยแห่งชาติ



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การปั้นเส้นใยด้วยไฟฟ้าชนิดทอเบรโชนอน/พอร์ซัลดีไฮด์เคลือบ  
และที่เคลือบด้วยฟิล์ม

นางสาวพนิตนาฏ อุดมเลิศ

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาหาหนทางลดต้นทุนปฏิกิริยาวิศวกรรมศาสตร์มหาวิทยาลัย  
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ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย



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ELECTROSPINNING OF NEAT AND ALUMINIUM-DOPED  
RESORCINOL/FORMALDEHYDE GEL

Miss Panitnart Ubollers

A Thesis Submitted in Partial Fulfillment of the Requirements  
for the Degree of Master of Engineering Program in Chemical Engineering

Department of Chemical Engineering

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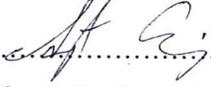
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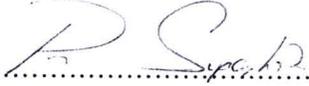
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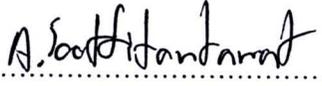
  
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เส้นใยคาร์บอนและอนุภาคทรงกลมคาร์บอนที่มีโครงสร้างรูพรุนแบบเมโซ สามารถ  
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จากสภาวะการบ่ม, ระยะเวลาในการบ่ม, ปัจจัยในการเตรียมอาร์เอฟเจล และตัวแปรใน  
กระบวนการปั่นเส้นใย ผลลัพธ์จากการปั่นเส้นใยด้วยไฟฟ้าสถิตเมื่อใช้การเตรียมอาร์เอฟ  
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KEYWORDS : RESORCINOL/FORMALDEHYDE GEL / FIBERS / MESOPOROUS / ELECTROSPINNING

PANITNART UBOLLERS: ELECTROSPINNING OF NEAT AND ALUMINIUM-DOPE RESORCINOL/FORMALDEHYDE GEL. ADVISOR: ASST. PROF. VARONG PAVARAJARN, Ph.D., CO-ADVISOR: PROF. PITT SUPAPHOL, Ph.D., 102 pp.

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Mesoporous structure of carbon fibers and carbon nanospheres were successfully prepared from combination of sol-gel method and electrospinning techniques. Mesoporous carbon with controllable pore size can be formed via the pyrolysis of resorcinol/formaldehyde (RF) gel. The RF gel was prepared by the sol-gel polycondensation of resorcinol (R) and formaldehyde (F) with sodium carbonate (C) as basic catalyst. Morphology and size distribution of RF fibers and RF particles can be controlled by aging condition, aging time of RF gel, preparation condition for RF gel and the processing parameters. Products from electrospinning of RF gel prepared by different condition and aged in 8% RH environment are micro-fibers with the average fiber diameter in the range of 1-5  $\mu\text{m}$ . For the RF-gel aged under high humidity (e.g. 45%, 75% and 100% RH), the products were found to be mostly spherical particles deposited on the collector. Addition of aluminium precursor, i.e., aluminium acetylacetonate into the RF gel followed by electrospinning of the gel were also investigated.

Department : Chemecal Engineering .....

Field of Study : Chemecal Engineering .....

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Student's Signature 

Advisor's Signature 

Co-advisor's Signature 

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