

การสร้างฟิล์มบางของเงินบนพอลิอิมิด์โดยปฏิกิริยารีดักชันที่ช่วยโดยการฉายรังสีเหนือม่วง



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FORMATION OF SILVER THIN FILM ON POLYIMIDE BY
REDUCTION ASSISTED BY UV IRRADIATION

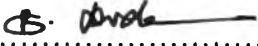
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A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Engineering Program in Chemical Engineering
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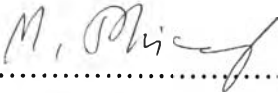
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ปาตินัน ซาลีผล : การสร้างฟิล์มบางของเงินบนพอลิอิมได์โดยปฏิกิริยารีดักชันที่ช่วยโดย
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การสร้างฟิล์มบางของเงินบนพอลิอิมได์โดยปฏิกิริยารีดักชันที่ช่วยโดยการฉายรังสีเหนือ
ม่วงได้ถูกเตรียมด้วยการเริ่มนำแผ่นพอลิอิมได์มาปรับปรุงผิวหน้าด้วยปฏิกิริยาไฮโดรไลซิสโดยใช้
สารละลายโพแทสเซียมไฮดรอกไซด์ พบว่าหลังจากที่ผิวหน้าของแผ่นพอลิอิมได์ได้ถูกปรับปรุง
แล้วสามารถดูดซับไอออนของเงินได้ด้วยกระบวนการแลกเปลี่ยนไอออน ไอออนของเงินถูกรีดิวซ์
ให้เปลี่ยนไปอยู่ในรูปของโลหะด้วยการฉายรังสีเหนือม่วง ในงานวิจัยนี้ได้ใช้การฉายรังสี 3 วิธีที่
แตกต่างกันได้แก่ 1) การฉายรังสีแบบปกติ 2) การฉายรังสีที่ใช้น้ำเป็นตัวช่วยในการฉายรังสี และ
3) การฉายรังสีเป็นรอบ จากผลการทดลองว่า การฉายรังสีแบบเป็นรอบนั้นให้ค่าความหนาของชั้น
เงินมากที่สุด (511.88 นาโนเมตร) โดยมีขนาดของอนุภาคนาโนของโลหะเงินประมาณ 28.31 นา
โนเมตร ชั้นของเงินบนแผ่นพอลิอิมได์ที่เกิดจากการฉายรังสีเหนือม่วงนั้นยังไม่สามารถนำไฟฟ้า
ได้ แต่พบว่าแผ่นพอลิอิมได์ที่เคลือบด้วยโลหะเงินด้วยการฉายรังสีแบบรอบนั้นสามารถเคลือบ
ทองแดงต่อไปได้ด้วยกระบวนการอิเล็กโตรเลสส์ โดยใช้สารละลายมีความเป็นด่างสูง

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PATINAN CHALEPHOL: FORMATION OF SILVER THIN FILM ON POLYIMIDE BY REDUCTION ASSISTED BY UV IRRADIATION.
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Formation of silver thin film on polyimide by reduction assisted by UV irradiation was prepared by first modifying surface of the polyimide film via hydrolysis reaction using potassium hydroxide aqueous solution. It was found that, after the surface of polyimide film was modified, silver ion could be absorbed to the film by ion-exchange process. Silver ion was reduced to form metallic silver by ultraviolet irradiation. In this work, 3 different irradiation procedures were used: 1) conventional irradiation, 2) water-assisted irradiation and 3) cycle irradiation. From the results it was found that cycle irradiation gave the thickest silver layer (511.88 nm) with diameter of silver nanoparticles of 28.31 nm. Silver layer grown by ultraviolet irradiation is still nonconductive, but it was also found that the silver coated on polyimide film by cycle irradiation procedure could be further coated by copper via electroless plating in strong basic solution.

Department :.....Chemical Engineering..... Student's Signature : *Patinan Chalephol*
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