

**DEVELOPMENT OF POLYANILINE SENSOR FOR
SULFURDIOXIDE DETECTION**



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The Petroleum and Petrochemical College, Chulalongkorn University
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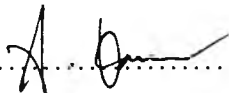
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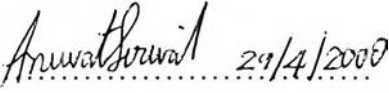
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พอลิอนีลีนีเมอร์ลิตินเบสซึ่งเป็นพอลิอนีลีนที่ไม่มีคุณสมบัติในการนำไฟฟ้าถูกสังเคราะห์ด้วยวิธีทางเคมีแบบการออกซิไดซ์โดยใช้แอมโมเนียมเปอร์ออกไซด์ซัลเฟตเป็นตัวออกซิไดซ์ ในการวิจัยนี้ สารละลายอนีลีนอีเมอร์ลิตินที่เตรียมได้โดยละลายผงอนีลีนอีเมอร์ลิตินด้วยตัวทำละลายเอ็นเมทิลไพโรลิโคลถูกเปลี่ยนให้อยู่ในสถานะของสารละลายเกลือพอลิอนีลีนอีเมอร์ลิตินที่มีคุณสมบัติการนำไฟฟ้าโดยใช้เทคนิคการโคปด้วยกรด การเตรียมฟิล์มเกลือพอลิอนีลีนอีเมอร์ลิตินสามารถกระทำได้โดยการระเหยตัวทำละลายเพื่อศึกษาคุณสมบัติการนำไฟฟ้าของฟิล์มนั้น กรดไฮโดรคลอริก กรดแคมฟอซัลฟอนิกและกรออีเทนซัลฟอนิกเป็นกรดที่ใช้ศึกษาผลกระทบของชนิดของกรดต่อคุณสมบัติการนำไฟฟ้าของพอลิอนีลีนฟิล์ม นอกจากนี้ เพื่อศึกษาผลกระทบของแก๊สต่อคุณสมบัติการนำไฟฟ้าศึกษาของพอลิอนีลีนฟิล์ม ค่าการนำไฟฟ้าของพอลิอนีลีนฟิล์มจึงถูกตรวจวัดภายใต้บรรยากาศของแก๊สผสมระหว่างแก๊สไนโตรเจนและแก๊สซัลเฟอร์ไดออกไซด์ การนำไฟฟ้าของพอลิอนีลีนที่โคปด้วยกรดแคมฟอซัลฟอนิกเพิ่มขึ้นภายใต้บรรยากาศของหนึ่งพันต่อล้านส่วนของแก๊สซัลเฟอร์ไดออกไซด์ในขณะที่พอลิอนีลีนฟิล์มที่โคปด้วยกรดไฮโดรคลอริกไม่แสดงการตอบสนอง การนำไฟฟ้าของพอลิอนีลีนที่โคปด้วยกรดแคมฟอซัลฟอนิกแปรผันโดยตรงกับระดับการโคปด้วยกรดเมื่อศึกษาภายใต้บรรยากาศของแก๊สซัลเฟอร์ไดออกไซด์ เปอร์เซนต์การเปลี่ยนแปลงของค่าการนำไฟฟ้าของฟิล์มพอลิอนีลีนที่โคปด้วยกรดแคมฟอซัลฟอนิกเพิ่มขึ้นเมื่อความเข้มข้นของแก๊สซัลเฟอร์ไดออกไซด์เพิ่ม

ABSTRACT

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Polyaniline emeraldine base (EB) powder, which is the non-conductive form of polyaniline, was synthesized by chemical oxidative polymerization using ammonium peroxydisulfate as an oxidant. In this work, EB solution prepared by dissolving EB powder in N-methylpyrrolidone was converted to emeraldine salt solution (conductive form) using the acid doping process. The ES films were prepared by evaporating solvent in order to study the film electrical conductivity. Three different types of acid dopant; hydrochloric acid, camphorsulfonic acid and ethanesulfonic acid were used to investigate the effect of acid dopant and concentration on the electrical conductivity of polyaniline films. In addition, polyaniline films were exposed to SO₂ gas to study the effect of the gas on the electrical conductivity of the films. The electrical conductivity of the CSA-doped polyaniline films increased when exposed to SO₂ at 1000 ppm whereas the HCl-doped polyaniline films did not show any response. The electrical conductivity of the CSA-doped polyaniline films varied linearly with doping ratio when exposed to SO₂. Furthermore, the percentage change in electrical conductivity after exposure to SO₂ gas of CSA-doped polyaniline films increased with SO₂ gas concentration.

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