

**ELECTRICAL CONDUCTIVITY RESPONSE OF
POLY(PHENYLENE VINYLENE)/ZEOLITE COMPOSITES
EXPOSED TO AMMONIUM NITRATE**



Jirarat Kamonsawas

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By: Jirarat Kamonsawas


Program: Polymer Science

Thesis Advisors: Assoc. Prof. Anuvat Sirivat


Dr. Pimpa Hormnirun


Dr. Walaiporn Prissanaroon

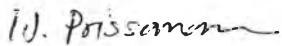
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..... College Director
(Assoc. Prof. Nantaya Yanumet)


Thesis Committee:


.....
(Assoc. Prof. Anuvat Sirivat)


.....
(Dr. Pimpa Hormnirun)


.....
(Dr. Walaiporn Prissanaroon)


.....
(Assoc. Prof. Thirasak Rirksomboon)


.....
(Dr. Laddawan Wannatong)

ABSTRACT

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Jirarat Kamonsawas: Electrical Conductivity Response of Poly(phenylene vinylene)/Zeolite Composites Exposed to Ammonium Nitrate

Thesis Advisors: Assoc. Prof. Anuvat Sirivat, Dr. Pimpa Hormnirun and Dr. Walaiporn Prissanaroon.

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Poly(*p*-phenylene vinylene) (PPV) was chemically synthesized via the polymerization of *p*-xylene-bis(tetrahydrothiophenium chloride) monomer and doped with H₂SO₄. In order to improve sensitivity of the sensor, Zeolite Y (Si/Al = 5.1, 30, 60, 80) is added into the conductive polymer matrix. The sensitivity of the sensor increases with increasing Si/Al ratio. The highest electrical conductivity sensitivity is obtained with the doped PPV/Zeolite Y (Si/Al = 80) is slightly higher than those doped of the PPV/Zeolite Y (Si/Al = 5.1). The electrical sensitivity values obtained are equal to 0.201, 1.37, 2.80 and 3.18, respectively. The difference in the interaction between NH₄NO₃ molecules and the sensing material on the electrical sensitivity has been investigated by using doped PPV/Zeolite Y (Si/Al = 5.1, 30, 60, 80, H⁺) as a model through the IR measurements.

บทคัดย่อ

จิราวัฒน์ กมลสวัสดิ์ : การสร้างคอมโพสิตของพอลิฟีนิลีน ไวนิลีนและซีโอไลท์เพื่อใช้ในการตรวจวัดก๊าซแอมโมเนียมไนเตรต (Electrical Conductivity Response of Poly(phenylene vinylene)/Zeolite Composites Exposed to Ammonium Nitrate)
อ. ที่ปรึกษา : รศ.ดร. อนุวัฒน์ ศิริวัฒน์ , ดร. พิมพา หอมนิรันดร์ และดร. วลัยพร ปฤษณรุณ

พอลิฟีนิลีนไวนิลีนเป็นพอลิเมอร์นำไฟฟ้าชนิดหนึ่งที่มีความสามารถใช้เป็นวัสดุที่ใช้สำหรับงานตรวจวัดก๊าซได้เนื่องจากสามารถเปลี่ยนแปลงคุณสมบัติทางแสงและทางไฟฟ้าได้เมื่ออยู่ภายใต้สภาวะของก๊าซชนิดพิเศษ พอลิฟีนิลีนไวนิลีนถูกสังเคราะห์โดยวิธีพอลิเมอร์ไรเซชันโดยใช้พอลิพาราไซลีนบิสเตตระไฮโดรไทโอฟีนและเพิ่มความสามารถทางการนำไฟฟ้าด้วยสารละลายซัลฟูริกแอซิด จากนั้นได้ศึกษาการตอบสนองทางคุณสมบัติการนำไฟฟ้าของพอลิฟีนิลีนไวนิลีนเมื่อสัมผัสกับก๊าซแอมโมเนียมไนเตรต เพื่อเพิ่มความไวดังกล่าว จึงผสมซีโอไลท์เข้ากับเมทริกซ์ของพอลิฟีนิลีนไวนิลีน พบว่าความไวในการจับก๊าซแอมโมเนียมไนเตรตเพิ่มขึ้นเมื่อสัดส่วนของซิลิกอนและอลูมิเนียม พบว่าความไวทางคุณสมบัติการนำไฟฟ้าของคอมโพสิตเมื่อผสมซีโอไลท์วายเป็นอัตราส่วนของซิลิกอนและอลูมิเนียมเท่ากับ 80 มีความไวมากที่สุด ซึ่งสามารถตรวจสอบการเกิดปฏิกิริยาได้โดยใช้ FTIR

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