

**PROTON CONNECTION ROUTE IN POLYMER MATRIX: A NEW
GENERATION FOR MEMBRANE FUEL CELL
(PART I: HETEROCYCLIC DERIVATIVES OF POLYMERIC CHAIN)**



Ms. Mullika Pongchavanakul

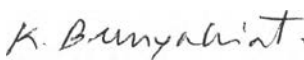
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ABSTRACT

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Mullika Pongchavanakul: Proton Connection Route in Polymer Matrix: A New Generation for Membrane Fuel Cell

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Keywords : Polymer Electrolyte Membrane Fuel Cell (PEMFC), Proton Connection Route, Heterocyclic Group, Imidazole, Adenine

A well-designed polymeric material having heterocyclic molecule where an expected effective proton connection route is proposed. In the present work, heterocyclic derivative of polymeric chain was prepared. The aza-methylene phenol molecule was selected as a spacer molecule to conjugate with heterocyclic molecule. Adenine was applied as a functional group to provide proton transferring system through the resonance structure of imidazole unit. The products of each preparation step were structural characterized by fourier transform infrared spectroscopy (FTIR), proton nuclear magnetic resonance spectroscopy (^1H NMR), mass spectroscopy (MS) and elemental analysis (EA).

บทคัดย่อ

มัลลิกา พงษ์ชวณะกุล: การออกแบบโมเลกุลพอลิเมอร์เพื่อการผ่านโปรตอนสำหรับเมมเบรนในเซลล์เชื้อเพลิง ส่วนที่ 1 อนุพันธ์เฮเทโรไซคลิกของสายโซ่พอลิเมอร์ (Proton Connection Route in Polymer Matrix: A New Generation for Membrane Fuel Cell (Part I: Heterocyclic Derivatives of Polymeric Chain)) อ. ที่ปรึกษา: รศ. ดร. สุวบุญ จิรชาญชัย และ ศาสตราจารย์ ดร. โคอิชิ คอนโด 43 หน้า ISBN 974-17-2328-8

งานวิจัยนี้เน้นถึงการออกแบบโมเลกุลและการสังเคราะห์พอลิเมอร์เมมเบรนให้มีหมู่เฮเทโรไซคลิกที่เอื้อให้เกิดการผ่านของโปรตอนอย่างมีประสิทธิภาพสูง ในส่วนที่ 1 ของงานวิจัยนี้เป็นเรื่องของการเตรียมอนุพันธ์เฮเทโรไซคลิกของสายโซ่พอลิเมอร์ สารอาซาเมทีลีนพีนอลถูกนำมาประยุกต์ใช้เป็นโมเลกุลกลางเพื่อเตรียมโครงสร้างหลักที่มีหมู่เฮเทโรไซคลิก อะดีนีนที่มีโครงสร้างจำเพาะของหมู่อิมิดาโซลซึ่งทำหน้าที่เป็นตัวส่งผ่านโปรตอนอย่างมีประสิทธิภาพได้ถูกนำมาเชื่อมต่อเข้ากับโครงสร้างหลัก การออกแบบและสังเคราะห์ในแต่ละขั้นได้ถูกตรวจสอบผลการวิเคราะห์โครงสร้างด้วยเทคนิคฟูเรียร์ทรานซ์ฟอร์มอินฟราเรดสเปกโทรสโกปี (FTIR) นิวเคลียร์แมกเนติกเรโซแนนซ์สเปกโทรสโกปีของโปรตอน (^1H NMR) แมสสเปกโทรสโกปี (MS) และปริมาณธาตุที่เป็นองค์ประกอบในสาร (EA)

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