

**PROTON DONOR AND ACCEPTOR POLYMER CHAINS UNDER
LAYERED-BY-LAYERED STRUCTURE OF POLYMER ELECTROLYTE
MEMBRANE FUEL CELL (PEMFC)**



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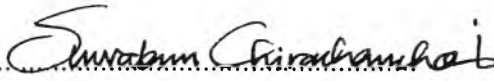
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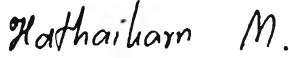
Thesis Title: Proton Donor And Acceptor Polymer Chains Under Layered-
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ABSTRACT

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This research focuses on the development of proton conductive performance of polymer membrane for using at high temperature under anhydrous system. Heterocyclic molecules such as imidazole and benzimidazole, etc. as a proton conductive species demonstrate the high hydrogen bond interaction with varied number of heterocyclic units. Moreover, the acid functional group plays an important role in providing protons, which have an effect on proton conductive performance. To combine the concepts of proton donor-acceptor with uniform molecular arrangement of heterocyclic molecules to enhance proton conductive performance under anhydrous system, the layered-by-layered structure membrane is proposed.

บทคัดย่อ

ณัฐวุฒ รัตนอภิรมยกิจ : ชื่อหัวข้อวิทยานิพนธ์ การพัฒนาประสิทธิภาพในการนำโปรตอนของพอลิเมอร์อิเล็กโตรไลต์เมมเบรนภายใต้โครงสร้างแบบชั้นต่อชั้นสำหรับเซลล์เชื้อเพลิงแบบพอลิเมอร์อิเล็กโตรไลต์ (Proton Donor And Acceptor Polymer Chains under Layered-by-Layered Structure For Polymer Electrolyte Membrane) อ. ที่ปรึกษา : ศาสตราจารย์ ดร. สุวบุญ จิรชาอุษัย 32 หน้า

งานวิจัยฉบับนี้ได้มุ่งเน้นการพัฒนาประสิทธิภาพในการนำโปรตอนของพอลิเมอร์เมมเบรนสำหรับใช้ในที่อุณหภูมิสูงภายใต้สภาวะที่ปราศจากการใช้น้ำ โมเลกุลประเภทเฮเทอโรไซคลิก ตัวอย่างเช่น อิมิดาโซล และ เบนซิมิดาโซล ซึ่งเป็นโมเลกุลจำพวกที่สามารถนำโปรตอนได้ โดยโมเลกุลของเฮเทอโรไซคลิกได้แสดงให้เห็นว่าอันตรกิริยาของพันธะไฮโดรเจนมีความสัมพันธ์กับการเพิ่มจำนวนของหน่วยเฮเทอโรไซคลิก นอกจากนี้หมู่กรดยังมีหน้าที่สำคัญในการให้โปรตอนซึ่งมีอิทธิพลต่อประสิทธิภาพในการนำโปรตอน เพื่อที่จะรวมแนวความคิดของโมเลกุลที่สามารถให้และรับโปรตอนได้ ซึ่งมีการจัดเรียงตัวของโมเลกุลของเฮเทอโรไซคลิกอย่างเป็นระเบียบเพื่อเพิ่มประสิทธิภาพในการนำโปรตอนภายใต้ระบบที่ไม่ใช้น้ำ ฉะนั้นเมมเบรนที่มีโครงสร้างแบบชั้นต่อชั้นจึงได้ถูกนำเสนอในงานนี้

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