

**DEVELOPMENT OF NOVEL NON-AQUEOUS THERMALLY STABLE
MEMBRANES FOR THE USE IN POLYMER ELECTROLYTE
MEMBRANE FUEL CELL (PEMFC)**



Manita Jithunsa

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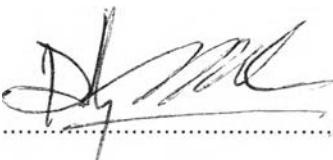
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By: Manita Jithunsa

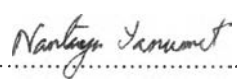
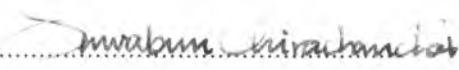
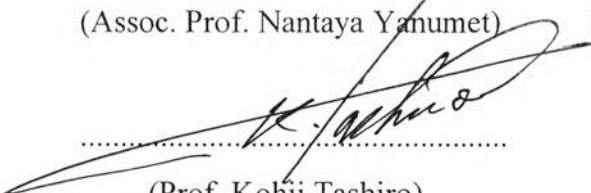
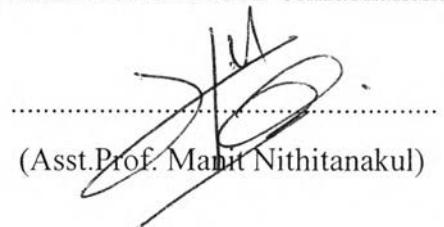

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Prof. Kohji Tashiro

Accepted by the Petroleum and Petrochemical College, Chulalongkorn University, in partial fulfilment of the requirements for the Degree of Doctor of Philosophy.


..... Dean
(Asst. Prof. Pomthong Malakul)

Thesis Committee:

 (Assoc. Prof. Nantaya Yanumet)	 (Assoc. Prof. Suwabun Chirachanchai)
 (Prof. Kohji Tashiro)	 (Asst. Prof. Manit Nithitanakul)
 (Assoc. Prof. Jatuphorn Wootthikanokkhan)	

ABSTRACT

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The present project stands on a viewpoint of a synthesized polymeric membrane material having a definite functional group, which an effective proton-transferring pathway is possible for PEM. Compared with water molecule, the imidazole is expected to function not only for providing better thermal stability but also allowing a similarly effective proton transferring via its specific structure. Here, the work originally proposes a series of imidazole functionalized polymeric material, for example, (i) copolymers of acrylic acid and 4-vinylimidazole including temperature dependency and structural relationships, (ii) SPEEK blended with Poly (AA-co-4VIm). (iii) polyamide functionalized with imidazoles, The goal of the project is to achieve a novel polymeric material for high efficiency proton transferring polymer membrane to be used in PEMFC system.

บทคัดย่อ

มานิตา จิตต์หรรษา : พอลิเมอร์ไอออน: การพัฒนาเมมเบรนแบบใหม่ที่ส่งผ่านโปรตอนแบบปราศจากโมเลกุลน้ำและมีความเสถียรต่อความร้อนสำหรับการใช้ในเซลล์เชื้อเพลิงประเภทพอลิเมอร์อิเล็กโทรไลต์ (Development of Novel Non-aqueous Thermally Stable Membranes for the Use in Polymer Electrolyte Membrane Fuel Cell (PEMFC)) อ. ที่ปรึกษา: รศ.ดร. สุวบุญ จิรชาญชัย และศาสตราจารย์โคจิ ทาชิโระ 120 หน้า

วิทยานิพนธ์ฉบับนี้เสนอ 3 วิธีการสังเคราะห์วัสดุพอลิเมอร์เมมเบรนที่มีหมู่ฟังก์ชันเฉพาะที่เอื้อต่อการส่งผ่านโปรตอนสำหรับเมมเบรนแลกเปลี่ยนโปรตอน หมู่ดังกล่าว คือ อิมิดาโซล ซึ่งนอกจากจะให้ค่าคงทนต่อความร้อนที่สูงกว่าโมเลกุลน้ำแล้ว ยังให้คุณสมบัติการส่งผ่านโปรตอนที่มีประสิทธิภาพดีเทียบเท่ากับโมเลกุลน้ำอีกด้วย งานวิจัยฉบับนี้ขอเสนอแนวคิดริเริ่มที่เกี่ยวกับวัสดุพอลิเมอร์เมมเบรนที่มีหมู่อิมิดาโซลสำหรับเซลล์เชื้อเพลิง ตัวอย่างเช่น (1) โคพอลิเมอร์ระหว่างกรดอะคริลิก และ 4-ไวนิลอิมิดาโซล พร้อมทั้งศึกษาการเปลี่ยนแปลงทางอุณหภูมิที่สัมพันธ์กับโครงสร้างเมมเบรน, (2) พอลิเมอร์ผสมระหว่างซัลโฟเนตเตตพอลิอีเทอร์อีเทอร์คีโตน และพอลิ (กรดอะคริลิก-โค-4-ไวนิลอิมิดาโซล), (3) พอลิเอไมด์ที่มีหมู่อิมิดาโซล จุดมุ่งหมายของงานวิจัยฉบับนี้มุ่งเน้นที่จะสังเคราะห์ให้ได้วัสดุพอลิเมอร์คุณสมบัติการส่งผ่านโปรตอนที่มีประสิทธิภาพดีเพื่อใช้ในพอลิเมอร์ประเภทเมมเบรนแลกเปลี่ยนโปรตอน

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