

**SYNTHESIS AND CHARACTERIZATION OF ALUMATRANE
COMPLEXES DIRECTLY FROM $\text{Al}(\text{OH})_3$ AND
TRIETHANOLAMINE**

Ms. Piyanun Boonprasert

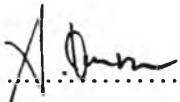
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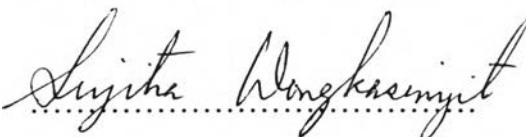
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ABSTRACT

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KEY WORDS : Alumatrane complexes / The oxide one pot synthesis /
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Piyanun Boonprasert : Synthesis and Characterization of Alumatrane Complexes Directly from $\text{Al}(\text{OH})_3$ and Triethanolamine. Thesis Advisors : Prof. Alexander M. Jamieson , Assoc. Prof. Anuvat Sirivat, and Asst. Prof. Sujitra Wongkasemjit, 124 pp. ISBN 974-638-515-1

Alumatranes can be prepared via several routes. The starting materials of all alumatrane synthesis routes are expensive and the multistep alumatrane obtained. *Laine (1992)* developed an inexpensive method of converting aluminum into polymeric precursors. In this work, the one step synthesis of alumatrane via the reaction of aluminum hydroxide, $\text{Al}(\text{OH})_3$, and triethanolamine, $\text{N}(\text{CH}_2\text{CH}_2\text{OH})_3$, was studied. The reaction was carried out in excess of ethylene glycol which was used as the solvent. The products were characterized by TGA, FTIR , viscosity measurement and light scattering technique in order to investigate the properties of the product in dilute solutions. Effects of TEA concentration, reaction temperature, reaction time and catalysis TETA concentration were studied. Both intrinsic viscosity and hydrodynamic radius increase with catalysis TETA concentration. From the viscosity and light scattering measurements, we found that ethylene glycol is a poor solvent for the alumatrane complexes synthesized.

บทคัดย่อ

ปริญญ์ บุญประเสริฐ : การสังเคราะห์และการหาลักษณะเฉพาะของสารประกอบอลูมาเทรนโดยตรงจากอลูมิเนียมไฮดรอกไซด์และไตรเอทานอลอะมีน (Synthesis and Characterization of Alumatrane Complexes Directly from Aluminum Hydroxide and Triethanolamine) วิทยานิพนธ์ปริญญา : วิทยาศาสตรบัณฑิต สาขาวิชาเคมี คณะวิทยาศาสตร์ มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าธนบุรี กรุงเทพมหานคร ๒๕๖๓ ๑๒๔ หน้า ISBN 974-638-515-1

สารประกอบอลูมาเทรนสามารถเตรียมได้หลายทาง สารเริ่มต้นของการสังเคราะห์สารประกอบอลูมาเทรนโดยวิธีต่างๆมีราคาแพง และเป็นการสังเคราะห์หลายขั้นตอน *Len (1992)* ได้พัฒนาวิธีเปลี่ยนสารประกอบโลหะออกไซด์ที่อลูมิเนียมในราคาไม่แพงให้เป็นสารเริ่มต้นทางพอลิเมอร์ ในงานวิจัยครั้งนี้ การสังเคราะห์อลูมาเทรนโดยปฏิกิริยาขั้นตอนเดียวโดยอลูมิเนียมไฮดรอกไซด์, $\text{Al}(\text{OH})_3$, และไตรเอทานอลอะมีน, $\text{N}(\text{CH}_2\text{CH}_2\text{OH})_3$, ได้ถูกศึกษาปฏิกิริยาดำเนินโดยใช้เอทิลีนไกลคอลเป็นตัวทำละลาย ผลิตภัณฑ์ที่ได้นำมาหาลักษณะเฉพาะโดย TGA, FTIR, การวัดความหนืด และเทคนิคการกระจายแสงได้ถูกนำมาศึกษาสมบัติของผลิตภัณฑ์ในสารละลายเจือจาง ผลกระทบของความเข้มข้นของ TEA, อุณหภูมิในการทำปฏิกิริยา, เวลาในการทำปฏิกิริยา และความเข้มข้นของตัวเร่งปฏิกิริยา TETA ได้ถูกนำมาศึกษาความหนืดและรัศมีไฮโดรไดนามิกส์เพิ่มขึ้นตามความเข้มข้นของตัวเร่งปฏิกิริยา TETA จากการวัดความหนืดและการวัดการกระจายแสง พบว่าเอทิลีนไกลคอลเป็นตัวทำละลายที่ไม่ดีสำหรับการสังเคราะห์สารประกอบอลูมาเทรน

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