

**A STUDY OF THE VOLUMETRIC PROPERTY OF SPIROSILICATE
AND SYNTHESIZED AMINOSPIROSILICATE DERIVATIVES**

Ms. Varangkana Jitchum

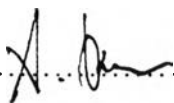
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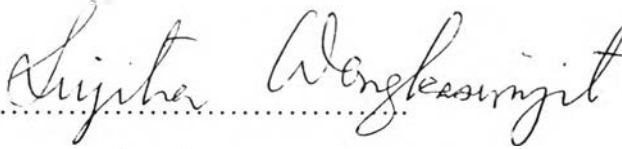
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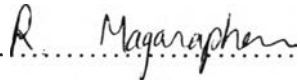
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ABSTRACT

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Idealistic materials used in many applications should have dimensional stability. However almost thermosets are cured with high shrinkage. The newly synthesized spirosilicate and new aminospinosilicate derivatives were studied their volumetric properties by curing without catalyst and measuring the change of density in the cured resins as compared to their corresponding monomers. It was found that all spirosilicates showed little volumetric shrinkage. It is due to the intermolecular hydrogen bonding in the system, resulting in packing of polymer chains.

บทคัดย่อ

วราภคณา จิตตชุ่ม : การศีกษาสมบัติทางด้านการเปลี่ยแปลงปริมาตรของ สารสไปโรซิลิเกต และอนุพันธ์ตัวใหม่ของสารอะมิโนสไปโรซิลิเกต (A Study of the Volumetric Property of Spirosilicate and Synthesized Aminospirosilicate Derivatives) อ. ที่ปรึษา : ศ. คร. ฮัตสึโอะ อิซิดะ และ รศ. คร. สุจิตรา วงศ์เกษมจิตต์ 52 หน้า ISBN 974-334-197-8

วัสดุที่นำมาใช้งานด้านต่าง ๆ นั้น สมบัติที่สำคัญอย่างหนึ่งทีต้องมื คือการคงรูปร่าง ได้ตลอดการใช้งาน แต่วัสดุที่เรียกว่าเทอร์โมเซตส่วนใหญ่ นั้นมักจะเกิดการหดตัวอย่างมากใน ขณะขึ้นรูป ในการทดลองครั้งนี้ได้ทำการศึกษาถึงสมบัติการเปลี่ยแปลงทางด้านการปริมาตรของ สารสังเคราะห์ขึ้นใหม่ทีเรียกว่าสไปโรซิลิเกตและอนุพันธ์ของสารอะมิโนสไปโรซิลิเกต โดย ปราสจากการใช้ตัวเร่งในการเกิดปฏิกิริยาพอลิเมอไรเซชัน การศีกษาสมบัติด้านนี้กระทำได้โดย การวัดการเปลี่ยแปลงของความหนาแน่นของสารทีพอลิเมอไรซ์แล้ว เพื่อเปรียบเทียบกับสาร ตั้งต้น จากการทดลองพบว่าสารสไปโรซิลิเกตทุกตัวมีการหดตัวเพียงเล็กน้อย ทีเป็นเช่นนี้ เพราะว่ามีเกิดการพันระไฮโครเจนระหว่างโมเลกุลในโครงสร้างของสาร ทำให้เกิดการช้อนทับ กันของสายพอลิเมอร์ได้คืมีผลทำให้มีการหดตัวเกิดขึ้น

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ABBREVIATIONS

C2	Spirosilicate product (having two carbons)
C3	Aminospinosilicate product (having three carbons)
C4	Aminospinosilicate product (having four carbons)
EG	Ethylene Glycol
TETA	Triethylenetetramine