

**INTERPOLYMER COMPLEXATION:  
A SIMPLE SYSTEM TO PRODUCE HYDROGEL AND AEROGEL**



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## บทคัดย่อ

สุติมา ฉัตรภูติ : อินเทอร์พอลิเมอร์ คอมเพล็กซ์เซชัน: ระบบอย่างง่ายในการเตรียม ไฮโดรเจล และแอโรเจล (Interpolymer Complexation: A Simple System to Produce Hydrogel and Aerogel.) อ. ที่ปรึกษา: รศ. ดร. สุวบุญ จิรชาญชัย 42 หน้า

งานวิจัยนี้นำเสนอแบบจำลองของอินเทอร์พอลิเมอร์คอมเพล็กซ์ไฮโดรเจล ภายใต้ โครงสร้างการเชื่อมโยงแบบกายภาพ ไฮโดรเจลที่เตรียมได้จากการผสมสารละลายพอลิไวนิล แอลกอฮอล์ และพอลิอะคริลิกเอซิด ด้วยอัตราส่วนผสมที่แตกต่างกัน แสดงให้เห็นว่าขั้นตอนการ แข็งแล้วทิ้งให้ละลาย เป็นวิธีที่สามารถผลิตไฮโดรเจลได้อย่างมีประสิทธิภาพ การระเหิดน้ำแข็ง เป็นกระบวนการที่ใช้ในการเปลี่ยนไฮโดรเจลให้เป็นแอโรเจล การให้ความร้อนต่อแอโรเจลจะเอื้อ ให้เกิดความแข็งแรงของเจลได้ตามที่ได้ผลจากการวิเคราะห์เชิงความร้อน การเพิ่มปริมาณผลึก ของพอลิไวนิลแอลกอฮอล์ในโครงสร้างของแอโรเจล สามารถช่วยเพิ่มความแข็งแรงของแอโรเจล ได้เช่นกัน

## ABSTRACT

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A model of interpolymer complex (IPC) hydrogel under physically crosslinked structure is proposed. The hydrogel prepared from the mixture of poly(vinyl alcohol) (PVA) and poly(acrylic acid) (PAA) at various ratio by freezing-thawing proves to be an effective method. Freeze-drying of hydrogel is used as a procedure to convert hydrogel to aerogel. Heat treatment applied to hydrogel initiates the gel strength as clarified by thermogravimetry analysis. An increase of PVA crystallinity in IPC enhances the mechanical and thermal properties of the aerogel.

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