

**PREPARATION OF POLYBENZOXAZINE-DERIVED PARTIALLY
ORDERED CARBON**

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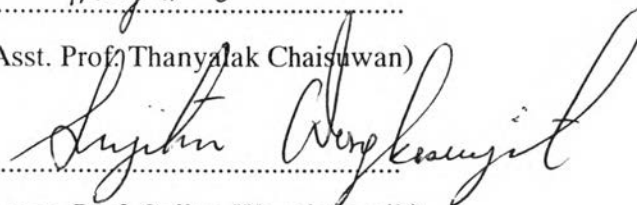


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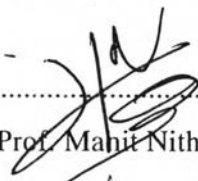
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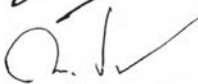
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ABSTRACT

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Partially ordered carbon have been widely studied and used in various applications such as gas separation, catalyst supports, and electrode materials. They have been conventionally prepared by pyrolysis and physical or chemical activation of organic precursors such as polymers, in which the pore size and pore structure, can be controlled at a high temperature in inert atmosphere. In this study, the solventless process was used to prepare polybenzoxazine precursor, which was synthesized from formaldehyde, phenol and aromatic diamine to produce nanocarbon with high chair yield. The effects of the pyrolysis temperatures on the microstructure of the obtained partially ordered carbon were investigated. The change in the chemical structure of polybenzoxazine was examined by FTIR and TGA was used to investigate thermal properties. The physical properties were examined by SAA. In addition, XRD was used to demonstrate the characteristics of d spacing in partially ordered carbon. The electrical property of partially ordered carbon was observed at room temperature by an electrometer with two-point probe.

บทคัดย่อ

วัชรินทร์ เขียดเดช : การเตรียมคาร์บอนที่ได้จากการสังเคราะห์พอลิเบนซ็อกซาซีนโดยกระบวนการทางความร้อน (Preparation of Polybenzoxazine-derived Partially Ordered Carbon) อ. ที่ปรึกษา: ผู้ช่วยศาสตราจารย์ ดร. ธัญญลักษณ์ ฉายสุวรรณ และรองศาสตราจารย์ ดร. สุจิตรา วงศ์เกษมจิตต์ 74 หน้า

ปัจจุบันได้มีการศึกษาวิจัยเกี่ยวกับคาร์บอนอย่างกว้างขวาง อีกทั้งคาร์บอนสามารถนำมาใช้งานได้อย่างหลากหลาย เช่น การแยกแก๊ส วัสดุสำหรับบรรจุสารตัวเร่ง และอิเล็กโทรด คาร์บอนสามารถเตรียมได้จากสารอินทรีย์ เช่น พอลิเมอร์ และใช้กระบวนการเปลี่ยนแปลงองค์ประกอบทางเคมีเพื่อให้ได้คาร์บอน ด้วยวิธีการเผาภายใต้บรรยากาศแก๊สในโตรเจนโดยการควบคุมระดับความร้อนและอัตราการไหลของแก๊สในโตรเจน นอกจากนี้การกระตุ้นทางกายภาพและเคมีสามารถเพิ่มคุณสมบัติทางกายภาพของคาร์บอนได้อีกด้วย งานวิจัยนี้ใช้กระบวนการที่ปราศจากตัวทำละลายเพื่อเตรียมพอลิเบนซ็อกซาซีน สังเคราะห์ได้จากฟอร์มัลดีไฮด์ ฟีนอล และเอมีนที่มีองค์ประกอบของอะโรมาติก เพื่อเพิ่มปริมาณสุทธของคาร์บอนที่ได้จากการเผา งานวิจัยนี้มุ่งเน้นศึกษาผลของความร้อนจากการเผา ซึ่งส่งผลกระทบต่อโครงสร้างระดับไมโครของคาร์บอน การเปลี่ยนแปลงโครงสร้างทางเคมีของพอลิเบนซ็อกซาซีนสามารถวัดโดย FTIR คุณสมบัติทางความร้อนของตัวอย่างสามารถตรวจสอบโดยใช้เครื่องวิเคราะห์การเปลี่ยนแปลงน้ำหนักของสาร โดยอาศัยคุณสมบัติทางความร้อน นอกจากนี้คุณสมบัติทางกายภาพสามารถทดสอบได้โดยการวิเคราะห์พื้นที่ผิว และการศึกษาการเปลี่ยนแปลงโครงสร้างผลึกของคาร์บอนสามารถวิเคราะห์ได้โดย XRD และศึกษาสมบัติการนำไฟฟ้าของคาร์บอน

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