

**STUDY ON THE BENZOXAZINE MONOMERS AND
THEIR APPLICATION FOR ION EXTRACTION MATERIAL**

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for the Degree of Master of Science
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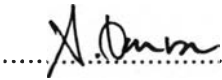
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บทคัดย่อ

สุทธินันท์ พงษ์ธรรมรักษ์ : การศึกษาเบนซอกซาซีนมอนอเมอร์และการประยุกต์สำหรับการเป็นวัสดุจำแนกไอออน (Study on the Benzoxazine Monomers and Their Application for Ion Extraction Material) อ.ที่ปรึกษา : ศ. ฮัทสึโอะ อิชิดะ (Prof. Hatsuo Ishida) และ ดร. สุวบุญ จิราญชัย 42 หน้า ISBN 974-638-444-9

อนุพันธ์ของเบนซอกซาซีนสามประเภท ได้แก่ 3-เมทิล-3,4-ไดไฮโดร-6,8-ไดเมทิล-2เอช-1,3-เบนซอกซาซีน (3-methyl-3,4-dihydro-6,8-dimethyl-2H-1,3-benzoxazine, Bm1) 3-เมทิล-3,4-ไดไฮโดร-6-เมทิล-8-โบรโม-2เอช-1,3-เบนซอกซาซีน (3-methyl-3,4-dihydro-6-methyl-8-bromo-2H-1,3-benzoxazine, Bm2) และ 3-เมทิล-3,4-ไดไฮโดร-6-เมทิล-2เอช-1,3-เบนซอกซาซีน (3-methyl-3,4-dihydro-6-methyl-2H-1,3-benzoxazine, Bm3) ซึ่งมีหมู่ฟังก์ชันต่างกันที่ตำแหน่งออร์โท (ortho) ของวงเบนซีน ได้ถูกสังเคราะห์ขึ้นและวิเคราะห์ด้วยโปรตอนนิวเคลียร์แมกเนติกเรโซแนนซ์ ($^1\text{H-NMR}$) คาร์บอนนิวเคลียร์แมกเนติกเรโซแนนซ์ ($^{13}\text{C-NMR}$) และฟูเรียร์ทรานส์ฟอร์มอินฟราเรดสเปกโทรสโกปี (FT-IR) การศึกษาสมบัติของสารประกอบหลัก-รอง (Host-guest compound) โดยการจำแนกไอออน พบว่า Bm1 ซึ่งเป็นเบนซอกซาซีนที่มีหมู่เมทิลที่ตำแหน่งออร์โท มีการจับไอออนสูงกว่า Bm3 ซึ่งไม่มีหมู่ฟังก์ชันใด ๆ ที่ตำแหน่งนั้น อันเป็นผลกระทบของสเตอริก (Steric effect) โดยที่โมเลกุลเบนซอกซาซีนประเภท Bm1 มีการจัดเรียงกลุ่มของโมเลกุล (Molecular assembly) แบบหลวม (flexible) ในขณะที่โมเลกุลของเบนซอกซาซีนประเภท Bm3 มีการจัดเรียงแบบแน่น (rigid) จึงทำให้เกิดความแตกต่างในการรับไอออน

ABSTRACT

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KEYWORDS: Benzoxazine monomer/ Ion extraction / Inclusion properties /
Structurally controlled benzoxazine derivatives

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Structurally controlled benzoxazine derivatives, i.e., 3-methyl-3,4-dihydro-6,8-dimethyl-2H-1,3-benzoxazine (Bm1), 3-methyl-3,4-dihydro-6-methyl-8-bromo-2H-1,3-benzoxazine (Bm2) and 3-methyl-3,4-dihydro-6-methyl-2H-1,3-benzoxazine (Bm3) with different functional group at ortho position on the phenol ring were successfully prepared as determined from ¹H-NMR, ¹³C-NMR, FTIR spectra as well as elemental analysis. Bm1, which has the bulky group of methyl at ortho position, gives higher ion extraction percentage than Bm3, which has no functional group at ortho position. In the case of Bm1, the steric effect of benzoxazine structure leads to the loosely packed molecular assembly which induces the higher ion affinity.

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