

**DEVELOPMENT OF NOVEL CARBON FOAM DERIVED FROM PHENOL-
ETHYLENEDIAMINE BENZOXAZINE PRECURSOR**



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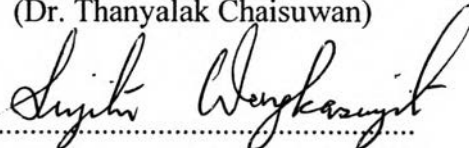
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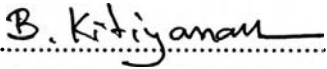
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ABSTRACT

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Carbon foam is prepared by using phenol-ethylenediamine benzoxazine as an organic precursor and azodicarbonamide (AZD) as a blowing agent. The effects of AZD concentration and polymerization rate on the porous structure and density of organic foams have been investigated. From DSC results, it has been found that the exothermic peaks of organic foam have shifted to lower temperature when the AZD concentration is increased. It is believed that AZD also acts as catalyst for benzoxazine ring-opening polymerization.

บทคัดย่อ

สมเกียรติ ศรีวานิชวิวัฒน์ : การพัฒนาโฟมของคาร์บอนที่ทำมาจากสารตั้งต้น ฟีนอล เอทิลีนไดเอมีน เบนซอกซาซีน (Development of Novel Carbon Foam Derived from Phenol-Ethylenediamine Benzoxazine Precursor) อ.ที่ปรึกษา: ดร.ธัญญลักษณ์ ฉายสุวรรณ และ รองศาสตราจารย์ ดร.สุจิตรา วงษ์เกษมจิตต์ 56 หน้า

โฟมของคาร์บอน สามารถเตรียมมาจาก ฟีนอล เอทิลีนไดเอมีน เบนซอกซาซีน กับ เอโซไดคาร์โบนาไมด์ ซึ่งเป็นสารที่ทำให้เกิดฟองก๊าซ ผลของความเข้มข้นของเอโซไดคาร์โบนาไมด์ และ อัตราการให้ความร้อนการบ่มฟีนอลเอทิลีนไดเอมีน เบนซอกซาซีน มีผลต่อโครงสร้าง, ความหนาแน่นของโฟมของออร์แกนิก ถูกตรวจสอบ ผลของ DSC แสดงให้เห็นว่า อุณหภูมิการบ่มของ ฟีนอล เอทิลีนไดเอมีน เบนซอกซาซีน ขยับไปทางอุณหภูมิที่ต่ำกว่าจากเดิม เมื่อเพิ่มความเข้มข้นของสารที่ทำให้เกิดฟองก๊าซ ผลของ DSC ทำให้เชื่อว่าสารทำให้เกิดฟองก๊าซ ทำหน้าที่เป็นตัวเร่งปฏิกิริยาในพอลิเมอไรเซชันแบบเปิดวงของพอลิเบนซอกซาซีน

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ABBREVIATIONS

ADC	azodicarbonamide
ATBN	amine-terminated butadiene-acrylonitrile rubber
AZD	azodicarbonamide
BA	blowing agent
CBA	chemical blowing agent
CFC	chlorofluorocarbon
CTBN	carboxyl-terminated butadiene-acrylonitrile rubber
DSC	differential scanning calorimeter
EPS	expanded polystyrene
FTIR	fourier transform spectroscopy
P-eda	phenol-ethylenediamine benzoxazine
PTFE	polytetrafluoroethylene
PCL	polycaprolactone
PBA	physical blowing agent
PC	polycarbonate
PF	phenol
PS	polystyrene
PSD	pore size distributon
PU	polyurethane
pPVC	poly(vinyl chloride)
SEM	scanning electron microscopy
SpC	specific compressive strength
TGA	thermalgravimatic analysis
T _g	transition temperature