

**C<sub>8</sub> AROMATICS COMPETITIVE ADSORPTION ON ZEOLITES USING  
THE HEADSPACE TECHNIQUE**



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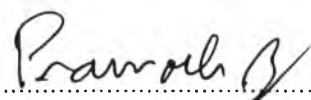
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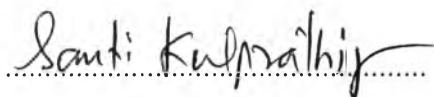


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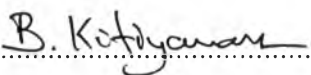
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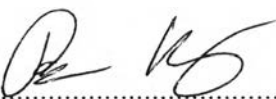
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## ABSTRACT

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chromatography.

Liquid phase adsorption of C<sub>8</sub> aromatics, *p*-xylene and *m*-xylene, in the presence of toluene, on NaY, KY, BaX, and BaY zeolites was investigated by headspace gas chromatography. Effects of temperature on the adsorption were studied by varying the operating temperature from 40 °C to 120 °C. Mixture compositions were also varied from 1.25 wt% to 20 wt%. Using the headspace technique, it was found that toluene affected the adsorption information due to its high vapor pressure. The adsorbed amounts of *p*-xylene and *m*-xylene increase when the temperature increases from 40 °C to 100 °C. The KY, BaX, and BaY zeolites selectively adsorb *p*-xylene for all studied conditions, while the NaY zeolite selectively adsorbs *m*-xylene at some studied conditions. The effects of the zeolites could be clearly seen at the high *p*-xylene and *m*-xylene concentrations. The KY zeolite gave the highest *p*-xylene selectivity followed by BaX, BaY, and NaY zeolites, respectively.

## บทคัดย่อ

เกษสุดา พรหมธีระวุฒิ : การดูดซับแบบแข่งขันระหว่างโรรมาติกส์คาร์บอนแปดอะตอมบนซีโอไลท์โดยใช้เทคนิคเฮดสเปซ (C<sub>8</sub> Aromatics Competitive Adsorption on Zeolites Using the Headspace Technique) อ. ที่ปรึกษา : รศ. ดร. ปราโมช รั้งสรรค์วิจิตร และ ดร. สันติ กุลประทีปปัญญา 66 หน้า

งานวิจัยนี้ศึกษาการดูดซับในสถานะของเหลวระหว่างพาราไซลีน และ เมตาไซลีน ในสถานะที่มีโทลูอินบนซีโอไลท์โซเดียมวาย, โพแทสเซียมวาย, แบริียมวาย, และแบริียมเอ็กซ์ด้วยวิธีเฮดสเปซ และได้ทำการศึกษาผลกระทบของอุณหภูมิตั้งแต่ 40 องศาเซลเซียสถึง 120 องศาเซลเซียส อีกทั้งยังศึกษาผลกระทบของความเข้มข้นของสารตั้งต้นในช่วงร้อยละ 1.25 โดยน้ำหนัก ถึงร้อยละ 20 โดยน้ำหนัก จากการทดสอบด้วยวิธีเฮดสเปซพบว่า โทลูอินส่งผลกระทบต่อข้อมูลของการดูดซับเนื่องจากโทลูอินมีความดันไอสูง ปริมาณที่ถูกดูดซับของพาราไซลีนและเมตาไซลีนเพิ่มขึ้นเมื่ออุณหภูมิในการดูดซับเพิ่มขึ้นจาก 40 องศาเซลเซียสถึง 100 องศาเซลเซียส ซีโอไลท์โพแทสเซียมวาย, แบริียมวาย, และแบริียมเอ็กซ์เลือกดูดซับพาราไซลีนในทุกสถานะที่ศึกษาในขณะที่ซีโอไลท์โซเดียมวายเลือกดูดซับเมตาไซลีนในบางสถานะ นอกจากนี้ที่ปริมาณความเข้มข้นของพาราไซลีน และ เมตาไซลีนสูงจะสามารถเห็นผลกระทบของชนิดของซีโอไลท์ได้ชัดเจน จากการทดลองทั้งหมดซีโอไลท์โพแทสเซียมวายให้ค่าซีล็คติวิตีของพาราไซลีนต่อเมตาไซลีนสูงที่สุด รองลงมาคือ แบริียมเอ็กซ์, แบริียมวาย, และโซเดียมวายตามลำดับ

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