

**EFFECT OF TYPE AND STRENGTH OF ELECTROLYTES ON THE  
ADSORPTION AND ADSOLUBILIZATION INTO ADSORBED CTAB  
ON PRECIPITATED SILICA**

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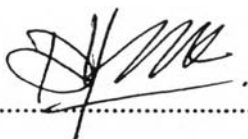
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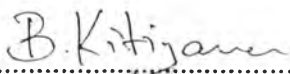
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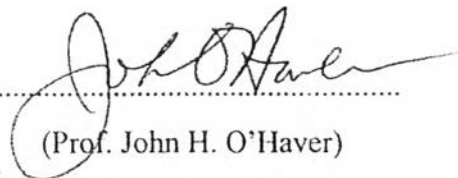


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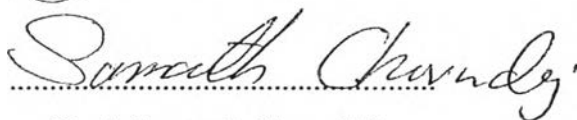
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**ABSTRACT**

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Kanokpan Rattanapiboon: Effect of Type and Strength of Electrolytes on the Adsorption and Adsolubilization into Adsorbed CTAB on Precipitated Silica.

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The aim of this research was to evaluate the adsorption and adsolubilization of acetophenone into cetyltrimethylammonium bromide (CTAB) adsorbed on precipitated silica with different electrolyte types (NaCl, MgCl<sub>2</sub>, MgSO<sub>4</sub>, and Na<sub>2</sub>CO<sub>3</sub>). The electrolyte concentration was varied in order to obtain better understanding of effect of electrolyte on adsorption and adsolubilization into CTAB adsorbed on silica. The presence of electrolytes resulted in a shift of the CTAB adsorption isotherm if the CTAB equilibrium concentration was lower than its CMC. The divalent anions had higher CTAB adsorption than the monovalent anions; whereas the presence of electrolytes reduced the maximum CTAB adsorption in the plateau region, according to the tendency to reduce the maximum CTAB adsorption, the electrolytes could be ranked as follows: NaCl > MgSO<sub>4</sub> > Na<sub>2</sub>CO<sub>3</sub> > MgCl<sub>2</sub> possibly due to the competitive adsorption between the cation of surfactant and the cation of electrolyte onto the negatively charged sites of the silica. The CTAB adsorption and maximum CTAB adsorption increased with increasing electrolyte concentration. Moreover, the presence of electrolytes caused an increase of adsolubilization. The monovalent anion had higher adsolubilization of acetophenone than the divalent anion. However, electrolyte concentration had insignificant effect on the adsolubilization of acetophenone.

## บทคัดย่อ

กนกพรพรณ รัตนไพบูลย์ : ผลกระทบของชนิดและความแรงของอิเล็กโทรไลต์ต่อการดูดซับและการแอคโซลูบิไลเซชันในซีเทบที่ดูดซับอยู่บนผิวของซิลิกา (Effect of Type and Strength of Electrolytes on the Adsorption and Adsolubilization into Adsorbed CTAB on Precipitated Silica) อ. ที่ปรึกษา : ศศ.ดร. บุนยรัชต์ กิตยานันท์ และ ศ.ดร. จอห์น เฮซ โอ เฮเวอร์ 61 หน้า

วัตถุประสงค์ของงานวิจัยเล่มนี้คือศึกษาการดูดซับและการแอคโซลูบิไลเซชันของแอสีโทฟีโนนในเซติลไตรเมทิลแอมโมเนียมโบรไมด์หรือซีเทบ (CTAB) ที่ดูดซับอยู่บนผิวของซิลิกา โดยใช้ชนิดของอิเล็กโทรไลต์แตกต่างกัน (โซเดียมคลอไรด์, แมกนีเซียมคลอไรด์, แมกนีเซียมซัลเฟต และโซเดียมคาร์บอเนต) และในแต่ละชนิดของอิเล็กโทรไลต์ยังใช้ความเข้มข้นแตกต่างกันด้วย เพื่อให้ได้รับความเข้าใจที่ดีขึ้นเกี่ยวกับผลกระทบของอิเล็กโทรไลต์ต่อการดูดซับและการแอคโซลูบิไลเซชันในซีเทบที่ดูดซับบนซิลิกา จากผลการทดลองบอกว่าอิเล็กโทรไลต์ช่วยเพิ่มการดูดซับซีเทบเมื่อความเข้มข้นสมมูลของซีเทบต่ำกว่าค่าซีเอ็มซี แต่ถ้าความเข้มข้นสมมูลของซีเทบมากกว่าค่าซีเอ็มซี อิเล็กโทรไลต์จะลดค่าสูงสุดของการดูดซับซีเทบ ซึ่งสามารถเรียงลำดับค่าสูงสุดของการดูดซับซีเทบจากมากไปน้อยได้ดังนี้ โซเดียมคลอไรด์ > แมกนีเซียมซัลเฟต > โซเดียมคาร์บอเนต > แมกนีเซียมคลอไรด์ อาจเนื่องมาจากไอออนบวกของอิเล็กโทรไลต์ดูดซับลงบนซิลิกา อิเล็กโทรไลต์ที่มีไอออนสองลบมีการดูดซับซีเทบมากกว่าไอออนหนึ่งลบนอกจากนี้อิเล็กโทรไลต์ยังช่วยเพิ่มการแอคโซลูบิไลเซชันของแอสีโทฟีโนน อิเล็กโทรไลต์ที่มีไอออนหนึ่งลบมีการแอคโซลูบิไลเซชันของแอสีโทฟีโนนมากกว่าไอออนสองลบ เมื่อเพิ่มความเข้มข้นของอิเล็กโทรไลต์จะทำให้การดูดซับซีเทบและค่าสูงสุดของการดูดซับซีเทบเพิ่มขึ้น แต่ความเข้มข้นของอิเล็กโทรไลต์จะมีผลเพียงเล็กน้อยต่อการแอคโซลูบิไลเซชันของแอสีโทฟีโนน

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**ABBREVIATIONS**

CAC	Critical admicelle concentration
CMC	Critical micellization concentrations
CTAB	Cetyltrimethylammonium bromide
EO	Ethylene oxide
HMC	Hemimicelle concentration
ODS	Octadecyltrichlorosilane
PZC	Point of zero charge

**LIST OF SYMBOLS**

v	Volume (mL)
$\rho$	Density (g/mL)
K	Adsolubilization equilibrium constant