REMOVAL OF TRACE CONTAMINANTS FROM WASTEWATER BY USING POLYBENZOXAZINE-BASED AEROGEL

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A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science
The Petroleum and Petrochemical College, Chulalongkorn University
in Academic Partnership with
The University of Michigan, The University of Oklahoma,
Case Western Reserve University
2010

Thesis Title:	Removal of Trace Contaminants from Wastewater by Using Polybenzoxazine-based Aerogel
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ABSTRACT

5172035063: Polymer Science Program
Supanan Luangsukrerk: Removal of Trace Contaminants from Wastewatere by Using Polybenzoxazine-based Aerogel.
Thesis Advisor: Dr.Thanyalak Chaisuwan and Assoc. Prof. Sujitra Wongkasemjit 47 pp.
Keywords: Heavy metals/ Wastewater/ Polybenzoxazine-based aerogel/ Polymeric ligand exchanger

The removal of trace contaminants from wastewater by polybenzoxazine-based aerogel, a novel type of phenolic resin, was studied in batch experiments. The adsorption behavior of polybenzoxazine towards metals was also investigated by varying amount of adsorbent and type of metals. The results indicated that polybenzoxazine-based aerogel showed more than 80% removal of Cu(II), Fe(II), Pb(II) and Sn(IV) following order: Sn(IV) > Cu(II) > Fe(II) > Pb(II). It was found that the metal adsorption onto polyben-zoxazine-based aerogel reached equilibrium in 12 hours. Furthermore, the adsorption behavior in mixed metals system, the adsorption isotherms and the feasibility of using polybenzoxazine-based aerogel as a polymeric ligand exchanger (PLE) were investigated.

บทคัดย่อ

สุภานัน เหลืองสุขฤกษ์ : การกำจัดสารปนเปื้อนจากน้ำเสียโดยใช้แอโรเจลที่เตรียมจากพอลิเบนซอกซาซีน (Removal of Trace Contaminants from Wastewater by Using Polybenzoxazine-based Aerogel) อ.ที่ปรึกษา : ดร.ธัญญลักษณ์ ฉายสุวรรณ์ และ รองศาสตราจารย์ ดร.สุจิตรา วงศ์เกษมจิตต์ 47 หน้า

ในงานวิจัยนี้ได้ทำการศึกษาการแยกสิ่งปนเปื้อนออกจากน้ำเสียโดยใช้แอโรเจลที่เตรียมจากพอลิเบนซอกซาซีนซึ่งเป็นฟีนอลิกเรซินชนิดหนึ่งด้วยกระบวนการดูดซับแบบกะ โดยที่พฤติกรรมของกระบวนการดูดซับโลหะของแอโรเจลที่ทำจากพอลิเบนซอกซาซีนนั้น ศึกษาได้จากการปรับปริมาณตัวดูดซับและชนิดของโลหะ ซึ่งผลการทดลองแสดงให้เห็นว่าแอโรเจลที่ทำจากพอลิเบนซอกซาซีนสามารถดูดซับทองแดง เหล็ก ตะกั่ว และตีบุก ได้มากกว่า 80 เปอร์เซนต์ ในส่วนของแนวโน้มการดูดซับโลหะเป็นไปตามลำดับดังนี้ ตีบุก > ทองแดง > เหล็ก > ตะกั่ว และยังพบว่าปริมาณการดูดซับโลหะโดยใช้แอโรเจลที่ทำจากพอลิเบนซอกซาซีนขึ้นอยู่กับเวลาที่ใช้ในการดูดซับ นอกจากนี้ผู้ทำการทดลองยังได้ศึกษาไอโซเทอร์มของการดูดซับ พฤติกรรมการดูดซับโลหะในสารละลายโลหะผสม และความเป็นไปได้ของการใช้แอโรเจลที่ทำจากพอลิเบนซอกซาซีนเป็นตัวแลกเปลี่ยนลิแกนด์

ACKNOWLEDGEMENTS

The author would like to thank Dr. Thanyalak Chaisuwan, her advisor and Associate Professor Sujitra Wongkasemjit, her co-advisor, who do not only originated this work, but also gave her continuous support, good suggestion, intensive recommendation and for the help, patience, encouragement they have shown during her one year in their research group.

She wishes to thank her thesis committee Assistant Professor Manit Nithitanakul and Assistant Professor Bussarin Ksapabutr for their suggestions and invaluable guidance.

Special thanks are to all of the Petroleum and Petrochemical College's professors who have given valuable knowledge to her at PPC and to the college staff who willingly gave support and encouragement.

This thesis work is funded by the Petroleum and Petrochemical College; and the National Center of Excellence for Petroleum, Petrochemical, and Advanced Materials, Thailand.

Her thanks are also to all her seniors and her friends for their helps, good suggestion, friendship and all the good memories.

Last, but not least, she thanks her family for giving her life, for educating her and unconditional support to pursue her interests and also for their love and encouragement.

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