

ผลของตัวเร่งปฏิกิริยาต่อดีพอลิเมอไรเซชันของพอลิสไตรีนที่ใช้แล้วเป็นเอทิลเบนซีน

นางสาวปณิตตา เมธาคุนวุฒิ



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

สาขาวิชาปิโตรเคมีและวิทยาศาสตร์พอลิเมอร์

บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย

ปีการศึกษา 2541

ISBN 974-332-420-8

ลิขสิทธิ์ของบัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย

๕ 1๑๖๗ ๘๐๒๔

**CATALYTIC EFFECT ON DEPOLYMERIZATION OF USED
POLYSTYRENE TO ETHYLBENZENE**



Miss Panatta Methakunvudhi

**A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Petrochemistry
Program of Petrochemistry and Polymer Science**

Graduate School

Chulalongkorn University

Academic Year 1998

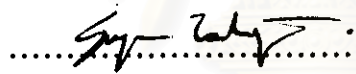
ISBN 974-332-420-8

Thesis Title **Catalytic Effect on Depolymerization of Used
Polystyrene to Ethylbenzene**
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Accepted by the Graduate School, Chulalongkorn University in Partial
Fulfillment of the requirements for Master's Degree

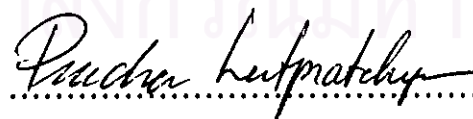
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ปณิตตา เมธาคณวุฒิ : ผลของตัวเร่งปฏิกิริยาต่อดีพอลิเมอร์ไรเซชันของพอลิสไตรีนที่ใช้แล้วเป็น
เอทิลเบนซีน (CATALYTIC EFFECT ON DEPOLYMERIZATION OF USED POLYSTYRENE
TO ETHYL BENZENE) อ. ที่ปรึกษา : รศ. ดร. โสภณ เจริญสำราญ , 131 หน้า.
ISBN 974-332-420-8 .

งานวิจัยนี้ได้ทำการศึกษามลของตัวเร่งปฏิกิริยาที่มีต่อการดีพอลิเมอร์ไรเซชันพอลิสไตรีนที่ใช้แล้ว
เป็นเอทิลเบนซีนโดยใช้ปฏิกิริยาการแตกตัวภายใต้ความดันของแก๊สไฮโดรเจนหรือแก๊สไนโตรเจนกับ
ตัวเร่งปฏิกิริยาแบบ 2 หน้าที่ได้แก่ เหล็ก-ดีบุก-ฟลูออไรด์, นิกเกิล-ดีบุก-ฟลูออไรด์, โคบอลต์-ดีบุก-ฟลูออไรด์,
เหล็ก-สังกะสี-ฟลูออไรด์, เหล็ก-ตะกั่ว-ฟลูออไรด์ และเหล็ก-อะลูมิเนียม-ฟลูออไรด์ ดูดซับอยู่บนโมเลคิวลาร์ซีฟ
สภาวะที่เหมาะสมสำหรับการแตกตัวไฮโดรเจน คือ ที่ความดันเริ่มต้นของแก๊สไฮโดรเจน 400 ปอนด์ต่อ
ตารางนิ้ว อุณหภูมิ 350 องศาเซลเซียส และใช้ตัวเร่งปฏิกิริยาที่ประกอบด้วยเหล็ก 5 เปอร์เซ็นต์, ดีบุก
5 เปอร์เซ็นต์ และฟลูออไรด์ 2 เปอร์เซ็นต์ บนโมเลคิวลาร์ซีฟ ในปริมาณ 15 เปอร์เซ็นต์โดยน้ำหนัก สภาวะ
ที่เหมาะสมสำหรับการแตกตัวภายใต้ความดันของแก๊สไนโตรเจนจะเหมือนกับการแตกตัวไฮโดรเจน แต่ใช้
ความดันเริ่มต้นของแก๊สไนโตรเจน 300 ปอนด์ต่อตารางนิ้ว ผลิตภัณฑ์ที่ได้ของทั้งสองสภาวะมีองค์ประกอบ
หลัก คือ เอทิลเบนซีน, โทลูอีน, ไอโซโพรพิลเบนซีน และไซลีน

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

ภาควิชา
สาขาวิชา ปิโตรเคมีและวิทยาศาสตร์พอลิเมอร์
ปีการศึกษา 2541

ลายมือชื่อนิติกร
ลายมือชื่ออาจารย์ที่ปรึกษา
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม

3970943023: MAJOR PETROCHEMISTRY AND POLYMER SCIENCE

KEY WORD: POLYSTYRENE / DEPOLYMERIZATION / HYDROCRACKING /
CRACKING

PANATTA METHAKUNVUDHI : CATALYTIC EFFECT ON
DEPOLYMERIZATION OF USED POLYSTYRENE TO ETHYLBENZENE.

THESIS ADVISOR : ASSO. PROF. SOPHON ROENGSUMRAN, Ph.D. 131 pp.
ISBN 974-332-420-8.

The catalytic effect on depolymerization of used polystyrene to ethylbenzene was studied. The cracking reaction was carried out under hydrogen or nitrogen pressure with bifunctional catalysts, i.e. Fe-Sn-F, Ni-Sn-F, Co-Sn-F, Fe-Zn-F, Fe-Pb-F and Fe-Al-F supported on molecular sieve. The optimum condition for hydrocracking was 400 psig initial hydrogen pressure, at 350 °C and 15% by weight of Fe(5%)-Sn(5%)-F(2%) on molecular sieve catalyst for 90 minutes. The optimum condition for cracking under nitrogen pressure was similar to hydrocracking, but the initial nitrogen pressure was 300 psig. The main components of products from both conditions were ethylbenzene, toluene, iso-propylbenzene and xylenes.

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

ภาควิชา.....

สาขาวิชา.....

ปีการศึกษา.....

ลายมือชื่อนิสิต.....

ลายมือชื่ออาจารย์ที่ปรึกษา.....

ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....

ACKNOWLEDGEMENT



The author wishes to express deepest gratitude to her advisor, Associate Professor Sophon Roengsumran, Ph.D., for being generous, understanding and encouraging throughout the course of this research. Special thanks are also offered to Assistant Professor Amorn Petsom, Ph.D., for his valuable advice and helpfulness.

In addition, she is grateful to Associate Professor Supawan Tantayanon, Ph.D., Assistant Professor Preecha Lertpratchya, Ph.D., Assistant Professor Somchai Pengprecha, Ph.D., for serving as chairman and members of her thesis committee, respectively, and for their valuable comments. She is grateful to Union Carbide, Inc. for supplying the materials. She appreciates help with the GC experiment from PTT.

The author would like to express her gratitude to her family for their love and encouragement, to her friends for their support throughout her study for the Master's Degree. She is also grateful to everyone who has contributed suggestions and support during the study.

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ABBREVIATIONS

psig = pound per square inches gauge

GC = Gas Chromatography



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จุฬาลงกรณ์มหาวิทยาลัย