

คะทาลิติกไฮโดรแครกกิงของโพลีโพรพิลีนที่ใช้แล้ว

นางสาวจินดา ยืนยงชัยวัฒน์

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# CATALYTIC HYDROCRACKING OF USED POLYPROPYLENE

Miss Jinda Yeyongchaiwat

A Thesis Submitted in Partial Fulfillment of the Requirements

for the Degree of Master of Science

Program of Petrochemistry and Polymer Science

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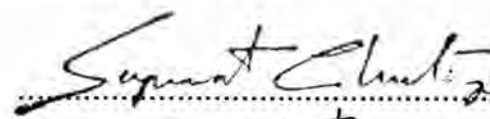
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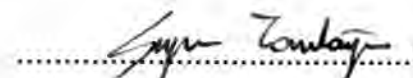
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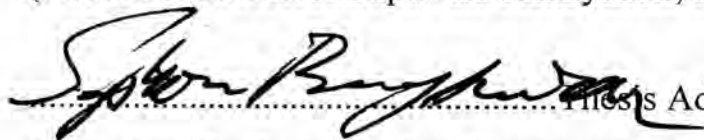
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A one-step catalytic process for cracking used polypropylene to fuel oil was developed. The catalyst used consisted of 2.5-5%wt., of iron, cobalt, nickel, tin and 1-2%wt. of fluoride dispersing throughout a porous carrier material, alumina or molecular sieve. The polypropylene was degraded by hydrocracking using the catalyst in amounts of 20-40%wt., at temperature between 300-360°C, and hydrogen pressure between 300-500 psig for 3-12 hours. The optimum condition 360°C, 500 psig, 6 hr., was found when using Ni(5%)-Sn(5%)-F(2%) on molecular sieve. The percentage yield was 86.0%wt.. The oil obtained consisted of C<sub>8</sub>-C<sub>16</sub> hydrocarbons with diesel properties corresponding to a good cetane index.

ภาควิชา.....

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ลายมือชื่อนิสิต..... จินดา มีนพงษ์ไชยวัฒน์

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งานวิจัยนี้ใช้กระบวนการขั้นตอนเดียวในการแตกตัวโพลิโพรพิลีนที่ใช้แล้ว เป็นน้ำมันเชื้อเพลิง ตัวเร่งปฏิกิริยาที่ใช้ประกอบด้วย 2.5-5 เปอร์เซ็นต์โดยน้ำหนักของธาตุเหล็ก โคบอลต์ นิกเกิล ดีบุก และ 1-2 เปอร์เซ็นต์โดยน้ำหนักของฟลูออไรด์ ซึ่งกระจายตัวบนแกนพวยชนิด อะลูมินา หรือ ซีโอไลต์ โมเลคูลาร์ซีฟ โดยศึกษาการแปรค่าปริมาณตัวเร่งปฏิกิริยาในช่วง 20-40 เปอร์เซ็นต์โดยน้ำหนัก อุณหภูมิ ในช่วง 300-360 องศาเซลเซียส ความดันในช่วง 300-500 ปอนด์ต่อตารางนิ้ว และเวลาในช่วง 3-12 ชั่วโมง พบสภาวะที่เหมาะสมคือ อุณหภูมิ 360 องศาเซลเซียส ความดัน 500 ปอนด์ต่อตารางนิ้ว เวลา 6 ชั่วโมง เมื่อใช้ตัวเร่งปฏิกิริยา นิกเกิล 5 เปอร์เซ็นต์, ดีบุก 5 เปอร์เซ็นต์, ฟลูออไรด์ 2 เปอร์เซ็นต์ บนแกนพวย ซีโอไลต์ โมเลคูลาร์ซีฟ ปริมาณ 40 เปอร์เซ็นต์โดยน้ำหนัก ได้ปริมาณผลิตภัณฑ์ 86.0 เปอร์เซ็นต์โดย น้ำหนัก น้ำมันที่ได้มีจำนวนคาร์บอน 8-16 อะตอม โดยมีสมบัติเป็นน้ำมันดีเซลที่มีค่าซีเทนที่ดี

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ลายมือชื่ออาจารย์ที่ปรึกษา .....  
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## ABBREVIATIONS

HDPE	=	High Density Polyethylene
MFI	=	Melt flow index
MS	=	Molecular sieve
MSW	=	Municipal solid waste
MMD	=	Molecular mass distribution
MWD	=	Molecular weight distribution
PE	=	Polyethylene
PIB	=	Polyisobutylene
PP	=	Polypropylene
PS	=	Polystyrene
PVC	=	Polyvinyl chloride