

บทบาทของไนโตรเจนออกไซด์ต่อการเกิดและการกำจัดสารมัธยันตร์ในปฏิกิริยารีดักชันของ
ไนโตรเจนออกไซด์ด้วยไฮโดรคาร์บอนบนตัวเร่งปฏิกิริยาซีโอไลต์

นางสาวสิรินทร์กานต์ อิศรางกูร ณ อยุธยา



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ROLES OF NO_x ON THE FORMATION AND THE REMOVAL OF AN
INTERMEDIATE OF THE NO_x REDUCTION BY HYDROCARBONS ON
ZEOLITE CATALYSTS

Miss Sirinkan Isarangura na ayutthaya

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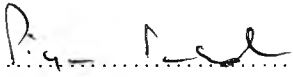
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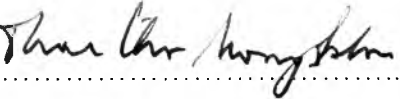
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สิรินทร์กานต์ อิศรางกูร ณ อยุธยา: บทบาทของไนโตรเจนออกไซด์ต่อการเกิดและการกำจัดสารมลพิษในปฏิกิริยารีดักชันของไนโตรเจนออกไซด์ด้วยไฮโดรคาร์บอนบนตัวเร่งปฏิกิริยาซีโอไลต์ (ROLES OF NO_x ON THE FORMATION AND THE REMOVAL OF AN INTERMEDIATE OF THE NO_x REDUCTION BY HYDROCARBONS ON ZEOLITE CATALYSTS) อ. ที่ปรึกษา : ศ.ดร.ปิยะสาร ประเสริฐธรรม, อาจารย์ที่ปรึกษาร่วม: ผศ.ดร.ธราธร มงคลศรี ; 98 หน้า ISBN 974-03-0120-7.

งานวิจัยนี้ทำการศึกษาบทบาทของไนโตรเจนออกไซด์ในปฏิกิริยารีดักชันของไนโตรเจนออกไซด์บนตัวเร่งปฏิกิริยาซีโอไลต์ด้วยเทคนิคแบบโปรแกรมอุณหภูมิ จากผลการทดลองพบว่า โพรพิลีนทำให้เกิดสารมลพิษบนตัวเร่งปฏิกิริยา HY, HM, H-ZSM-5 และ Cu-ZSM-5 น้อยกว่า โทลูอีน และสารมลพิษที่เกิดจากโทลูอีนเป็นสารมลพิษที่เกิดขึ้นในช่วงอุณหภูมิสูง ปริมาณสารมลพิษบนตัวเร่งปฏิกิริยาเหล่านี้เรียงตามลำดับคือ HM > Cu-ZSM-5 > HY ~ H-ZSM-5 ซึ่งลักษณะของสารมลพิษขึ้นอยู่กับชนิดของไฮโดรคาร์บอนและชนิดของตัวเร่งปฏิกิริยา และยังพบว่าเวลาในการทำปฏิกิริยามีผลต่อปริมาณของสารมลพิษที่เกิดขึ้นบนตัวเร่งปฏิกิริยาคด้วย อย่างไรก็ตามในปฏิกิริยารีดักชันแบบเลือกเกิดของทั้ง โพรพิลีนและโทลูอีนบนตัวเร่งปฏิกิริยา Cu-ZSM-5 เกิดสารมลพิษในปริมาณที่สูงมาก นอกจากนี้ยังพบว่าเมื่อใช้ในโตรเจนออกไซด์และออกซิเจนเป็นตัวออกซิไดซ์สารมลพิษจะทำให้สารมลพิษถูกเผาได้ง่ายขึ้น

จากการศึกษาการเกิดและการกำจัดสารมลพิษบนตัวเร่งปฏิกิริยาซีโอไลต์พบว่า NO₂ มีบทบาทสำคัญต่อการเกิดและการกำจัดสารมลพิษโดย NO₂ มีผลทำให้เกิดสารมลพิษมากขึ้น และสามารถกำจัดสารมลพิษบนตัวเร่งปฏิกิริยาได้ที่อุณหภูมิต่ำลง

ภาควิชา.....วิศวกรรมเคมี.....

สาขาวิชา.....วิศวกรรมเคมี.....

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ลายมือชื่อนิสิต...สิรินทร์กานต์ อิศรางกูร ณ อยุธยา...

ลายมือชื่ออาจารย์ที่ปรึกษา.....

ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....

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PROPENE/ TOLUENE/ TPO

SIRINKAN ISARANGURA NA AYUTTHAYA: ROLES OF NO_x ON THE FORMATION AND THE REMOVAL OF AN INTERMEDIATE OF THE NO_x REDUCTION BY HYDROCARBONS ON ZEOLITE CATALYSTS. THESIS ADVISOR: PROF. PIYASAN PRASERTHDAM, Dr.Ing., THESIS COADVISOR: ASSISTANT PROF. THARATHON MONGKHONSI, Ph.D., 98 pp. ISBN 974-03-0120-7.

Temperature programmed oxidation (TPO) has been used to investigate the role of nitrogen oxide on the catalytic reduction of nitric oxide over zeolite catalyst. The result shows that propene produced the intermediates on HY, HM, HZSM-5, Cu-ZSM-5 less than toluene and the intermediates formed from toluene is "harder" than the intermediate formed from propene. The amount of carbon formed on catalyst were HM>Cu-ZSM-5>HY~H-ZSM-5, respectively. It can be suggested that the nature of the intermediates depend on type of hydrocarbon and type of catalyst. It was obvious that the effect of time greatly affected the amount of the intermediates. However, the greater accumulation was occurred on the selective catalytic reduction of nitrogen oxide over Cu-ZSM-5 by propene and toluene. Additionally, the oxidizing gas mixture of nitrogen oxide and oxygen in helium can remove effectively the intermediates on Cu-ZSM-5.

By considering the formation and the removal of the intermediates on the zeolite catalysts, it was found that NO₂ play a crucial role in forming and removing intermediates. NO₂ affect the high amount of intermediates and the removal the intermediates at lower temperature.

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