

AMBIENT TEMPERATURE CO OXIDATION ON THE COMPOSITE
OXIDES SUPPORTED SILVER CATALYSTS

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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
and Case Western Reserve University

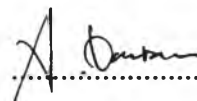
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ISBN 974-636-053-1

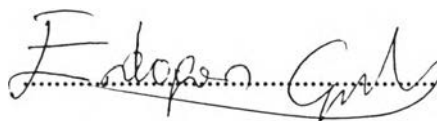
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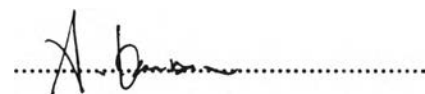
Thesis Title : Ambient Temperature CO Oxidation on the
Composite Oxides Supported Silver Catalysts
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ABSTRACT

##951015 : PETROCHEMICAL TECHNOLOGY PROGRAM

KEY WORD : LOW TEMPERATURE, CO OXIDATION, SILVER CATALYSTS,
METAL OXIDES

SOPHON BUTAMJAI : AMBIENT TEMPERATURE CO
OXIDATION ON THE COMPOSITE OXIDES SUPPORTED
SILVER CATALYSTS

THESIS ADVISORS : PROF. ERDOGAN GULARI AND PROF.
SOMCHAI OSUWAN, 46pp. ISBN 974-636-053-1

Low loading catalysts of silver oxides (0.1, 1, and 5 percent) supported on reducible metal oxides (oxides of manganese and cobalt) were prepared by co-precipitation technique, studied for their long term catalytic activities and characterized by XRD, BET, TEM, and TG. The silver catalysts calcined in air at 200 °C exhibited the highest activity. Their catalytic activities were a significant function of pretreatment conditions. Oxidative pretreatment increased the activity as reductive pretreatment substantially decreased in their catalytic activities. The deactivated catalysts were partially regenerated by reductive and humidified environment. However, the decay of catalytic activities appeared to be an irreversible process.

บทคัดย่อ

โสภณ บุ่ตามใจ : ปฏิกริยาออกซิเดชันของคาร์บอนมอนอกไซด์ ที่อุณหภูมิห้องด้วยตัวเร่ง
ปฏิกริยาเงินบนตัวรองรับออกไซด์ผสม (Ambient Temperature CO Oxidation on the
Composite Oxides Supported Silver Catalysts) อ.ที่ปรึกษา : ศ. ดร. เออร์โดแกน กุลาริ
(Prof. Erdogan Gulari) และ ศ. ดร. สมชาย โอสุวรรณ 46 หน้า ISBN 974-636-053-1

งานวิจัยนี้มีวัตถุประสงค์ เพื่อศึกษาความว่องไวของตัวเร่งปฏิกริยาเงินออกไซด์ที่มีเงินใน
ปริมาณต่ำ (0.1, 1 และ 5 เปอร์เซ็นต์โดยน้ำหนัก) บนออกไซด์ของแมงกานีส และ โคบอลต์โดยที่ตัว
เร่งปฏิกริยาจะถูกเตรียมโดยวิธีตกตะกอนร่วม (Co-precipitation technique) และศึกษาคุณสมบัติ
โดยเครื่อง XRD, BET, TEM และ TG

จากการทดลองพบว่า ตัวเร่งปฏิกริยาของเงินออกไซด์ที่ถูกเผา (Calcination) ในบรรยากาศ
ที่อุณหภูมิ 200 องศาเซลเซียส มีความว่องไว (Activity) มากที่สุด การปรับสภาพโดยใช้ออกซิเจนมีส่วน
ช่วยเพิ่มความว่องไวของตัวเร่งปฏิกริยา แต่การปรับสภาพโดยใช้ไฮโดรเจนส่งผลให้ความว่อง
ไวของตัวเร่งปฏิกริยาลดลงอย่างมาก ตัวเร่งปฏิกริยาที่เสื่อมสภาพไปแล้วถูกนำไปปรับสภาพให้สู่
สถานะเดิมโดยการผ่านไฮโดรเจนและไอน้ำ อย่างไรก็ตามตัวเร่งปฏิกริยาที่สูญเสียความว่องไวไป
แล้วจะกลับสู่สภาพเดิมค่อนข้างเป็นไปได้ยาก

ACKNOWLEDGMENTS

This work has been a very memorable, interesting, and enjoyable experience. This thesis would not have been possible without the consistent assistance of the following individuals and organizations.

My first deepest appreciation extends to Prof. Erdogan Gulari for serving as my thesis advisor who took much care in guiding, assisting, and providing timely support, meaningful and suggestions from the beginning to the end of this work. I am sincerely indebted to Prof. Somchai Osuwan, my co-advisor, who gave invaluable, resourceful criticism and comments to my research. I would also like to thank Dr. Pornpote Piumsomboon for generously accepting to be on my thesis committee and for his suggestions.

I am also greatly indebted to the Petroleum and Petrochemical College for the financial support in my research and all of my previous professors who guided me throughout their courses establishing the knowledge base I used in this research.

I am most obliged to all of my graduate friends for their friendly help, creative suggestions and encouragement. I owe a debt of gratitude to all of my friends for their continuous assistance in my experiments. I also express my appreciation to Erol Steker, who gave me numerous suggestions and discussion in different aspects at various stages of this work when I stayed at the University of Michigan, Ann Arbor.

Finally, I would like to express my deep gratitude to my father, mother, brother and sister whose eternal love, concern, encouragement, understanding and thoughtfulness played the greatest role in my success.

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