

**PREPARATION OF MOLYBDENUM OXIDE VIA SOL-GEL PROCESS
USING MOLYBDENUM GLYCOLATE AS PRECURSOR**

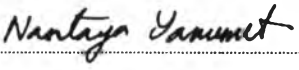
Kongthip Setwong

A Thesis Submitted in Partial Fulfilment 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, and Institut Français du Pétrole
2005
ISBN 974-9937-15-5

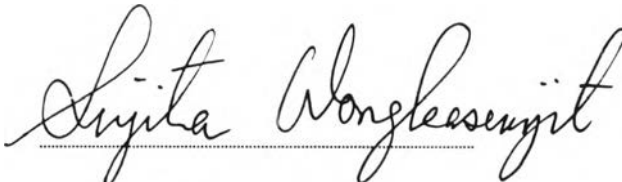
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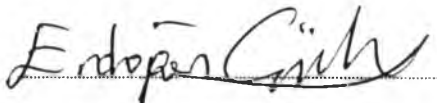
Thesis Title: Preparation of Molybdenum Oxide via Sol-gel Process Using
Molybdenum Glycolate as Precursor
By: Kongtip Setwong
Program: Polymer Science
Thesis Advisors: Associate Professor Sujitra Wongkasemjit
Professor Erdogan Gulari


Accepted by the Petroleum and Petrochemical College, Chulalongkorn
University, in partial fulfillment of the requirements for the Degree of Master of
Science.

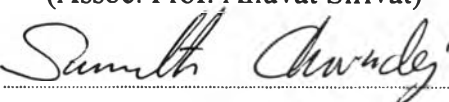

..... College Director
(Assoc. Prof. Nantaya Yanumet)

Thesis Committee:


.....
(Assoc. Prof. Sujitra Wongkasemjit)


.....
(Prof. Erdogan Gulari)


.....
(Assoc. Prof. Anuvat Sirivat)


.....
(Assoc. Prof. Sumaeth Chavadej)

ABSTRACT

4372017063: Polymer Science Program
Kongthip Setwong: Preparation of Molybdenum oxide via Sol-gel
Process using Molybdenum Glycolate as Precursor.
Thesis Advisors: Assoc. Prof. Sujitra Wongkasemjit and
Prof. E. Gulari, 64 pp. ISBN 974-9937-15-5
Keywords: Molybdenum oxide/ Molybdenum glycolate/ Sol-gel

Preparation of molybdenum oxide from molybdenum glycolate synthesized directly from the reaction of two commercially available molybdenum oxide and ethylene glycol, via the Oxide One Pot Synthesis (OOPS) process is achieved through sol-gel process. Due to the moisture stability of molybdenum glycolate precursor molybdenum oxide gel was formed using hydrochloric acid, nitric acid or non-acid catalysts. The prepared molybdenum oxides (MoO_3) were characterized using TGA, BET, SEM and XRD techniques, giving the orthorhombic structure at the calcinations temperature of 350°C . The crystallinity and morphology of the products are affected by the calcination temperature and acid type. The effects of reaction temperature, calcinations time and heating rate and adding methanol with nitric acid catalyst do not significantly influence the crystallinity and morphology. The specific surface areas of prepared molybdenum oxide are less than $60 \text{ m}^2/\text{g}$.

บทคัดย่อ

กองทิพย์ เศษวงศ์: การเตรียมโมลิบดีนัมออกไซด์ผ่านกระบวนการโซล-เจล โดยใช้โมลิบดีนัมไกลโคเลตเป็นสารตั้งต้น [Preparation of Molybdenum Oxide via Sol-gel Process Using Molybdenum Glycolate as Precursor], อาจารย์ที่ปรึกษา ศาสตราจารย์ ดร. เออโดแกน กุลาริ (Prof. Erdogan Gulari) และ รองศาสตราจารย์ ดร. สุจิตรา วงศ์เกษมจิตต์ 64 หน้า ISBN 974-9937-15-5

การเตรียมโมลิบดีนัมออกไซด์ผ่านกระบวนการโซล-เจลโดยใช้สารตั้งต้นโมลิบดีนัมไกลโคเลตที่สังเคราะห์ได้โดยกระบวนการเพียงขั้นตอนเดียวที่เรียกว่า Oxide One Pot Synthesis (OOPS) จากสารตั้งต้นสองชนิด คือ โมลิบดีนัมออกไซด์และเอทิลีนไกลคอลที่หาได้ง่ายโดยทั่วไปและราคาไม่แพง เนื่องจากโมลิบดีนัมไกลโคเลตเสถียรต่อความชื้นในอากาศจึงทำให้สามารถศึกษาวิธีการเตรียมเจลของโมลิบดีนัมออกไซด์ได้ ไม่ว่าจะใช้หรือไม่ใช้ตัวเร่งปฏิกิริยาที่เป็นกรดไฮโดรคลอริก หรือกรดไนตริก การวิเคราะห์สารประกอบโมลิบดีนัมออกไซด์ที่เตรียมได้ใช้วิธี TGA, BET, SEM และ XRD. โมลิบดีนัมออกไซด์ผ่านการเผาที่อุณหภูมิ 350 องศาเซลเซียส จะมีลักษณะโครงสร้างของออร์โธโรมบิก ปัจจัยของอุณหภูมิและ ชนิดของกรดที่ใช้มีผลต่อลักษณะของผลึกและรูปร่างสัณฐานรวมทั้งพื้นที่ผิวของโมลิบดีนัมออกไซด์ สำหรับอุณหภูมิที่ใช้เตรียมเจล เวลาและอัตราการให้ความร้อนในการเผารวมทั้งการเติมเมธานอลลงในของผสมโซล-เจล มีผลต่อลักษณะของผลึกและรูปร่างสัณฐานของผลิตภัณฑ์โมลิบดีนัมออกไซด์เพียงเล็กน้อย และโมลิบดีนัมออกไซด์ที่เตรียมได้มีพื้นที่ผิวน้อยกว่า 60 ตารางเมตรต่อกรัม

ACKNOWLEDGEMENTS

This work would not have been possible without the assistance of the following individuals.

First of all, the author is deeply indebted to Assoc. Prof. Sujitra Wongkasemjit, her thesis advisor, for providing valuable recommendations, intensive suggestions, creative comments, and encouragement throughout the course of her work. She also would like to give a great appreciation to her U.S. advisor, Prof. Erdogan Glulari

The author would like to thank Assoc. Prof. Anuvat Sirivat and Assoc. Prof. Nantaya Yanumet for her kind advice and for being on the thesis committee.

I am grateful for the partial scholarship and partial funding of the thesis work provided by Postgraduate Education, Research Programs in Petroleum and Petrochemical Technology (PPT Consortium) and Development Promotion of Science and Technology Thailand Project (DPST)

Special thanks go to all of the Petroleum and Petrochemical College's staff who helped her for using instrument

Furthermore, she would like to take this important opportunity to thank all of her graduate friends for their unforgettable friendship.

Finally, the sincerest appreciation is to her family whose love, encouragement, support and understanding play the greatest role in her success.

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