

**PREPARATION OF MESOPOROUS CeO<sub>2</sub>-ZrO<sub>2</sub> FOR  
CATALYTIC CONVERTER**

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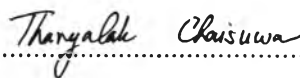


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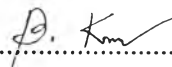
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**ABSTRACT**

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Currently, there is a great amount of ongoing research involved in catalytic converters because of their interesting applications in eliminating toxic gases from exhaust pipes. Many types of porous materials have been widely studied and used to increase the catalytic activity. In this work, mesoporous ceria-zirconia (CeO<sub>2</sub>-ZrO<sub>2</sub>) was synthesized using MCM-48 as a hard template via the nanocasting method. The obtained product provided a high surface area of 248.5 m<sup>2</sup>/g. The optimum conditions were to stir for 4 h at 100 °C evaporation temperature of solvent. The synthesized mesoporous CeO<sub>2</sub>-ZrO<sub>2</sub> was characterized using X-ray diffraction (XRD), X-ray fluorescence (XRF), Transmission electron microscopy (TEM), and N<sub>2</sub> adsorption/desorption. The Temperature-programmed reduction results provided only surface reduction temperatures at 280-620 °C.

## บทคัดย่อ

วัฒนาวุธ พาทีดี: การเตรียมซีเรียเซอร์โคเนียที่มีรูพรุนขนาดเมโซเพื่อใช้เป็นตัวเร่งปฏิกิริยาในเครื่องฟอกไอเสีย (Preparation of Mesoporous  $\text{CeO}_2\text{-ZrO}_2$  for Catalytic Converter)  
อาจารย์ที่ปรึกษา: รศ.ดร. สุจิตรา วงศ์เกษมจิตต์ และ ผศ.ดร. ธัญลักษณ์ ฉายสุวรรณณ์ 49 หน้า

ในปัจจุบันนี้ มีการศึกษาวิจัยอย่างต่อเนื่องที่เกี่ยวกับตัวเร่งปฏิกิริยาในเครื่องฟอกไอเสีย เพื่อนำไปประยุกต์ใช้ในการกำจัดมลพิษที่มาจากท่อไอเสียรถยนต์ วัสดุที่มีความเป็นรูพรุนหลากหลายชนิด ถูกนำมาศึกษาอย่างกว้างขวางและถูกใช้เพื่อเพิ่มความว่องไวในการเร่งปฏิกิริยา ในงานวิจัยนี้ ซีเรียเซอร์โคเนียที่มีความเป็นรูพรุนขนาดเมโซถูกสังเคราะห์ขึ้น โดยใช้ MCM-48 เป็นตัวแม่แบบและผ่านวิธีนาโนแคสดี้ง ผลิตภัณฑ์ที่ได้มีพื้นที่ผิวสูงถึง 248.5 ตารางเมตรต่อกรัม โดยใช้สภาวะการเตรียมที่มีการกวนสารละลายเป็นเวลา 4 ชั่วโมง และระเหยตัวทำละลายที่อุณหภูมิ 100 องศาเซลเซียส วัสดุที่สังเคราะห์ได้ ถูกพิสูจน์เอกลักษณ์โดยใช้เทคนิค XRD, XRF, TEM, และ  $\text{N}_2$ adsorption/desorption โดยช่วงในการเกิดปฏิกิริยา reduction ของผลิตภัณฑ์เกิดขึ้นที่ช่วงอุณหภูมิ 280-620 องศาเซลเซียส ซึ่งเป็นการเกิดปฏิกิริยาที่พื้นผิวของวัสดุ

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