

**ACTIVITY OF SUPPORTED Au CATALYST FOR PREFERENTIAL  
CO OXIDATION**



Sahil Chawla

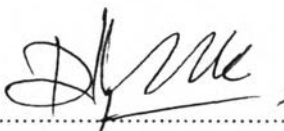
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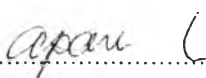
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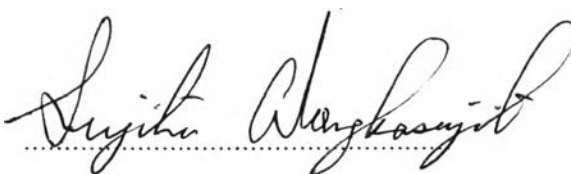
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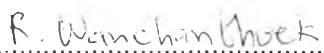
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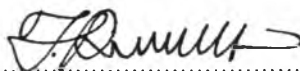
  
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## ABSTRACT

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Sahil Chawla: Activity of Supported Au Catalyst for Preferential CO Oxidation

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Preferential oxidation (PROX) of carbon monoxide is recognized to be the most suitable method to reduce the quantity of carbon monoxide in a H<sub>2</sub>-rich stream to an acceptable level for fuel cell applications. The aim of this research is to investigate the optimum condition of the prepared catalysts, Au/La-CeO<sub>x</sub> prepared by deposition-precipitation method, for PROX in the presence of H<sub>2</sub>. The effects of preparation parameters, such as support preparation method, drying method, gold loading, and calcination temperature, on the characteristic and catalytic activity of the catalysts were studied. The results showed that the Au/La-CeO<sub>x</sub> exhibited 90.9% CO conversion and 40.3% PROX selectivity at 100 °C. However, by applying O<sub>2</sub> pretreatment to the Au/La-CeO<sub>x</sub> catalyst at 120°C for 30 minutes, the CO conversion and PROX selectivity increased to 95.6% and 40.8%, respectively.

## บทคัดย่อ

สาहित ชาวลา : ความว่องไวในการเกิดปฏิกิริยาเคมีของตัวเร่งปฏิกิริยาทองสำหรับออกซิเดชันแบบเลือกเกิดของคาร์บอนมอนอกไซด์ (Activity of Supported Au Catalyst for Preferential CO oxidation) อ. ที่ปรึกษา: ผศ. ดร.อาภาณี เหลืองนฤมิตชัย รศ. ดร.สุจิตรา วงศ์เกษมจิตต์ และ ดร. รัชนิกร วันจันทร์ทิ

การเลือกเกิดปฏิกิริยาออกซิเดชันของก๊าซคาร์บอนมอนอกไซด์ได้รับการยอมรับให้เป็นวิธีที่เหมาะสมที่สุดในการลดปริมาณคาร์บอนมอนอกไซด์ในแก๊สสังเคราะห์เพื่อให้อยู่ในระดับที่ใช้งานในเซลล์เชื้อเพลิงได้ ในงานวิจัยนี้เป็นการศึกษาสภาวะที่เหมาะสมของตัวเร่งปฏิกิริยาทองบนตัวรองรับผสมระหว่างซีเรียออกไซด์และแลนทานัมออกไซด์ที่เตรียมด้วยวิธีการยัดเกาะควบคู่กับการตกผลึก (Deposition-precipitation) ตัวแปรที่ศึกษาที่มีอิทธิพลต่อความว่องไวของตัวเร่งปฏิกิริยามี วิธีการเตรียมตัวรองรับ วิธีการทำแห้ง อุณหภูมิที่ใช้ในการเผาเตรียมตัวเร่งปฏิกิริยา และปริมาณของทองที่ใช้ในการเตรียมตัวเร่งปฏิกิริยา และจากการศึกษาพบว่าในสภาวะที่เหมาะสมตัวเร่งปฏิกิริยาทองบนตัวรองรับผสมระหว่างซีเรียออกไซด์และแลนทานัมออกไซด์ให้ค่าการเปลี่ยนแปลงของแก๊สคาร์บอนมอนอกไซด์ที่ 90.9 เปอร์เซ็นต์ และค่าการเลือกเกิดปฏิกิริยากับแก๊สคาร์บอนมอนอกไซด์ที่ 40.3 เปอร์เซ็นต์ที่อุณหภูมิ 100 องศาเซลเซียส แต่เมื่อใช้การปรับสภาพด้วยออกซิเจนบนตัวเร่งปฏิกิริยาที่อุณหภูมิ 120 องศาเซลเซียส เป็นเวลา 30 นาที ช่วยทำให้การเปลี่ยนแปลงของแก๊สคาร์บอนมอนอกไซด์และการเลือกเกิดปฏิกิริยากับแก๊สคาร์บอนมอนอกไซด์เพิ่มขึ้นเป็น 95.6 เปอร์เซ็นต์และ 40.8 เปอร์เซ็นต์ตามลำดับ

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