

## CO<sub>2</sub> reforming using TiO<sub>2</sub>/Ni catalysts prepared by atomic layer deposition

Dong Wun Kim<sup>1</sup>, Kwang-Dae Kim<sup>1</sup>, Hyun Ook Seo<sup>1</sup>, Nilay Kumar Dey<sup>1</sup>, Myoung Joo Kim<sup>1</sup>,  
Young Dok Kim<sup>1\*</sup>, Dong Chan Lim<sup>2</sup>, Kyu Hwan Lee<sup>2</sup>

<sup>1</sup>Department of Chemistry, Sungkyunkwan University, Suwon, 440-746, Korea

<sup>2</sup>Materials Processing Division, Korea Institute of Materials Science, Changwon, 641-010, Korea

Atomic layer deposition (ALD) was used to deposit TiO<sub>2</sub> on Ni particles, and changes in the catalytic activity of Ni for CO<sub>2</sub> reforming of methane (CRM) were studied. In the presence of TiO<sub>2</sub> islands on Ni surfaces, the onset temperature of the CRM reaction was lower than that of bare Ni. During the CRM reaction, carbon was deposited on the surface, reducing the catalytic activity of the surface, but TiO<sub>2</sub> was able to remove the carbon deposits from the surface. When the Ni surface was completely covered with TiO<sub>2</sub>, catalytic activity disappeared, indicating that tuning of TiO<sub>2</sub> coverage on Ni is important for maximizing the activity of the CRM reaction.

**Keywords:** metal, Ni, metal-oxide, TiO<sub>2</sub>, CO<sub>2</sub>