

Surface control of metal nanocrystal for efficient CO<sub>2</sub> conversion using CO<sub>2</sub> and CO gas as surface ligand

김휘동, 이도창<sup>†</sup>

한국과학기술원

(dclee@kaist.edu<sup>†</sup>)

In this study, we control the surface of metal co-catalyst for efficient CO<sub>2</sub> conversion by introducing of adsorbed gas ligand such as CO and CO<sub>2</sub> during the photo-deposition process on TiO<sub>2</sub> film. In order to examine the photocatalytic activity of surface tuned metal, we perform the CO<sub>2</sub> conversion reaction using varying metal/TiO<sub>2</sub> samples. When CO act as gas ligand during the metal growth, resulting metal enhance to or inhibit photocatalysis for CO<sub>2</sub> conversion. Based on cyclic voltammetry and in-situ FTIR results, we expect that this contrasted result is strongly relevant to CO binding energy of metal. On the other hand, CO<sub>2</sub> conversion rate is increased regardless of type of metal, when CO<sub>2</sub> act as gas ligand. It is responsible for high adsorption property of metal with CO<sub>2</sub>, since specific facet, which has strong binding energy with CO<sub>2</sub>, is developed during the metal growth under CO<sub>2</sub> gas.