

## Electrochemical CO<sub>2</sub> reduction to formic acid on hierarchical Cu pillar structure

정재훈, 원다혜, 고재강, 우성일<sup>†</sup>

한국과학기술원

(siwoo@kaist.ac.kr<sup>†</sup>)

To achieve high performance of electrochemical CO<sub>2</sub> reduction, a series of Cu pillar structure electrodes (Cu 2.5h, Cu 5h) was fabricated by using electrodeposition method and their catalytic activities and reaction mechanism were investigated. The series of Cu pillar structure exhibited improved electrocatalytic activities toward CO<sub>2</sub> reduction to formic acid (HCOOH) as Cu pillar on electrode grew up. Cu 5h electrode showed a prominent performance with a 28% of faradaic efficiency to formic acid at -0.5 V (vs RHE). X-ray diffraction (XRD) analysis and Ultra violet photoelectron spectroscopy (UPS) implied that the enhanced catalytic activities were primarily attributed to the increased (111) facet which energetically favourable to produce HCOOH. Also, it was suggested that the series of Cu pillar structure electrodes improved the electron transfer to adsorbed CO<sub>2</sub> due to the decreased work function of Cu pillar structure.