Cu-based Bimetallic Wrinkled Catalyst for the Selective CO_2 Reduction

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Electrochemical reduction of carbon dioxide (CO_2) is a key technology to resolve increasing energy demands and environmental problems. Among various materials for electrochemical catalysts, copper (Cu)-based catalysts are remarkably favorable because they exhibit unique performance in CO_2 reduction that can convert into valuable products. Various strategies have been studied to increase the activity for CO_2 conversion so far, and we recently reported a nanowrinkled Cu catalyst with high-facets which was generated by chemical vapor deposition (CVD) graphene growth process. In this study, we introduced other noble metals such as gold (Au) and palladium (Pd) into the nanowrinkled Cu to further study how both high-facets and alloy catalysts can contribute to the final products. Different reaction pathways can be expected when Au and Pd are introduced in wrinkled Cu, resulting in contrasting product selectivity. To further investigate the effect of alloys in final products, we investigated the selectivity changes by controlling the metal ratios maintaining the high-facet property. As a result, Au-Cu showed exclusive selectivity towards CO and Pd-Cu to CO and CH_4.