Copper foam with nanocube for electrocatalyst for CO_2 reduction

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Due to the increase in the use of fossil fuels, global warming has been a crucial issue, and reduction of CO_2 can be one way to resolve current problem. However, especially for converting CO_2 into C2 products such as ethylene, low selectivity and high energy consumption has been a key problem. To produce C2 products, copper catalyst is needed. Thus, various electrocatalysts were therefore demonstrated such as copper foam, copper wire, copper cube, and so on.
Here, we suggest a combined structure of both foam and cube made of copper. This work focuses on producing both foam and cube structure at the same time to enhance the selectivity of ethylene over others, and also to suppress the production of methane. By generating foam structure and cube structure at the same time, the faradaic efficiency of ethylene came out to be about 34% at −1.5 V vs RHE, and also the production ratio of ethylene over methane came out to be as high as 150, at an ethylene faradaic efficiency of 31%. These illustrate that copper foam with nanocube electrocatalyst successfully converted CO_2 into ethylene with a relatively high faradaic efficiency, and also suppressed the selectivity of methane highly.