Intermediates confined AuCu tandem catalyst for CO_2 reduction

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Research for carbon dioxide conversion to hydrocarbon is crucial for future life due to fossil fuel depleting and earth environmental problems. The carbon dioxide reduction reaction(CRR) can produce the sustainable energy with maintaining carbon-nuetral.

On the CO_2 to C_2 products reaction, C-C dimerization step was known as rate-determining step. Both catalyst intrinsic properties and surrounding environment can promote the C-C- dimerization. By controlling the intrinsic property, binding energy of surface and intermediates of CRR can be regulated. The surrounding environmental was generally controlled via nanosturcture of catalyst to confine the OH^- or intermediates of CRR.

In this study, we developed the nanostructure to maximize the surrounding environmental effect via combining the tandem and confined structure. At the confined tandem catalyst, CO_2 was converted to CO on Au surface and diffused to Cu. Because the Cu has nanopore structure, diffusion of CO was blocked and confined inside the Cu. The confined tandem structure shows the high efficiency and selectivity for C_2 products.