# Effect of binder on $Cu_2O$ electrode for $CO_2$ reduction

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Carbon capture, utilization, and storage (CCUS) technologies have attracted much attention to mitigate global warming and climate change. Electrochemical $CO_2$ reduction reaction ($CO_2$RR) is a promising CCU technology, which produces value-added chemicals and fuels at the mild conditions (e.g., room temperature and pressure). Moreover, $CO_2$RR using renewable electricity can be a long-term solution to achieve a carbon cycle loop. However, multicarbon ($C_{2+}$) products formation is still challenging due to the low selectivity, activity, and stability compared to $C_1$ products. The Nafion binder is commonly used to prepare gas diffusion electrodes (GDEs) which use the gas-phase $CO_2$ for enhancing the production rate. In this work, we synthesized the facet-controlled Cu2O catalyst and prepare GDEs with different Nafion binder content to investigate the binder effect. As a result, the selectivities of $C_{2+}$ products were increased with lower binder content due to the suppression of hydrogen evolution reaction (HER).