

High-density of Cu step-sites for highly selective CO₂ conversion into C2 oxygenate

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Electrochemical CO₂ conversion into valuable C2 fuel products has been studied intensively since these C2 products have high energy densities and can be used as a chemical feedstock and a fuel. Among various candidates of electrocatalyst for CO₂ conversion, copper (Cu) has attracted strong attention due to its unique property to produce C2 products. Especially, step sites of Cu have showed higher C2 selectivity comparing with flat surface of Cu. Despite of many efforts, still there are no reports which deal with high density of step sites electrocatalyst. In this work, we developed step-dominated Cu wrinkle film via graphene growth for highly C2 selective electrocatalyst. Resulted Cu wrinkle catalyst showed high C2 products selectivity achieving 50 % of faradaic efficiency for C2 oxygenate formation at -0.8 V vs. reversible hydrogen electrode (RHE), which is the largest value compared to previous reports before. Moreover, the partial current density of C2 oxygenate was significantly high as 6 mA/cm² at -1.2 V (vs. RHE) indicating that suitable productivity value for a practical use.