

Abstract:

The electrochemical conversion of CO₂ into valuable chemicals and fuels has earned significant attention recently. However, it remains challenges to find suitable catalysts with high selectivity and activity towards a specific product. Here, we synthesized copper (Cu) and tin (Sn) bimetallic catalyst via microwave-assisted method that demonstrates high selectivity in converting CO₂ to formate. The selectivity for formate production was optimized by fine-tuning the Cu-to-Sn atomic ratio. Among the catalysts, Cu₁Sn₃ with a Cu-to-Sn ratio close to 1:3 shows a selectivity of over 80% towards formate at a current density of 200 mA/cm². The high performance is attributed to synergetic catalytic effect between Cu and Sn, which is still under investigation. This approach could also be utilized to design and develop high-performance electrocatalysts for selective conversion of CO₂ to other products.