

Enhanced Faradaic Efficiency of Cu_2O Nanowire Photocathodes with Cu-incorporated Crystalline TiO_2 Shell for Photoelectrochemical CO_2 reduction

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In this study, we report enhancement of faradaic efficiency of copper oxide (Cu_2O) nanowire photocathodes with copper-incorporated crystalline TiO_2 for photoelectrochemical CO_2 reduction to methanol. Cu_2O is promising p-type semiconductor for photocathode, but due to its self-corrosion the faradaic efficiency is low in CO_2 reduction. We protect Cu_2O surface from water by passivating crystalline TiO_2 . In addition, we also adopt Cu species on TiO_2 surface to increase surface reactivity so that faradaic efficiency was enhanced to 44% from 26%.