

Copper Sulfide/Graphite Oxide Composite as Photocatalyst for CO₂ Photoreduction

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Photocatalytic conversion of carbon dioxide (CO₂) to hydrocarbons such as methanol makes possible simultaneous solar energy harvesting and CO₂ reduction. Our previous work is using graphite oxide (GO) as a promising photocatalyst for photocatalytic conversion of CO₂ to methanol.¹ When using graphite oxide as photocatalyst, the photocatalytic efficiency is 4-fold higher than TiO₂ powder.

This work investigates a modified method for using Cu₂S/Cu_{1.96}S mixture as electron trap to suppress the electron-hole pair recombination. We try to annealing copper and sulfur powder at various temperatures from 550°C to 930°C. During annealing process, we can control the Cu₂S/Cu_{1.96}S ratio of mixture powder. According to XRD result, it shown the Cu₂S/Cu_{1.96}S ratio of various annealing temperature from 630°C~930°C were 0.2, 0.4 0.4 and 0.5, respectively.

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1. Hsu, H.-C.; Shown, I.; Wei, H.-Y.; Chang, Y.-C.; Du, H.-Y.; Lin, Y.-G.; Tseng, C.-A.; Wang, C.-H.; Chen, L.-C.; Lin, Y.-C.; Chen, K.-H., Graphene oxide as a promising photocatalyst for CO₂ to methanol conversion. *Nanoscale* 2013, 5 (1), 262-268.

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