Support information

Preparation of ZrO_2

4.62g of $ZrO(NO_3)_2 \cdot 5H_2O$ was dissolved in 500 ml of water, and a 1 mol/L NaOH solution was added to the above solution to pH 7, and stirring was continued for 6 hours at room temperature. After filtration, washing, drying, and grinding, the abrasive powder in the muffle furnace was calcined at 550℃ for 4 hours to obtain a ZrO_2 sample.

Preparation of Cu/ZrO_2

4.62g of $ZrO(NO_3)_2 \cdot 5H_2O$ and 2.42g of $Cu(NO_3)_2 \cdot 3H_2O$ was dissolved in 500 ml of water，and a 1 mol/L NaOH solution was added to the above solution to pH 12, and stirring was continued for 12 hours at room temperature. After filtration, washing, drying, and grinding, the abrasive powder in the muffle furnace was calcined at 550℃ for 4 hours to obtain a $CuO\text{-}ZrO_2$ sample. $CuO\text{-}ZrO_2$ in a sample of the tube furnace under hydrogen atmosphere 350 ℃ reduction for 4 hours to obtain a Cu/ZrO_2 sample.

Preparation of Cu/RGO

1g of GO and 2.42g of $Cu(NO_3)_2 \cdot 3H_2O$ was dissolved in 500 ml of water, and a 1 mol/L NaOH solution was added to the above solution to pH 12, and stirring was continued for 12 hours at room temperature. After filtration, washing, drying, and grinding, Then the grinding powder at 550 ℃ under nitrogen atmosphere in the roaster roasting 4 hours, then pass into the hydrogen reduction under 350 ℃ 4 hours to get the sample of Cu/RGO.