

## Electronic Supplementary Information

### Improving water splitting catalytic performance of $\text{Cu}_2\text{O}$ through a synergistic “two-way transfer” process of Cu and graphene

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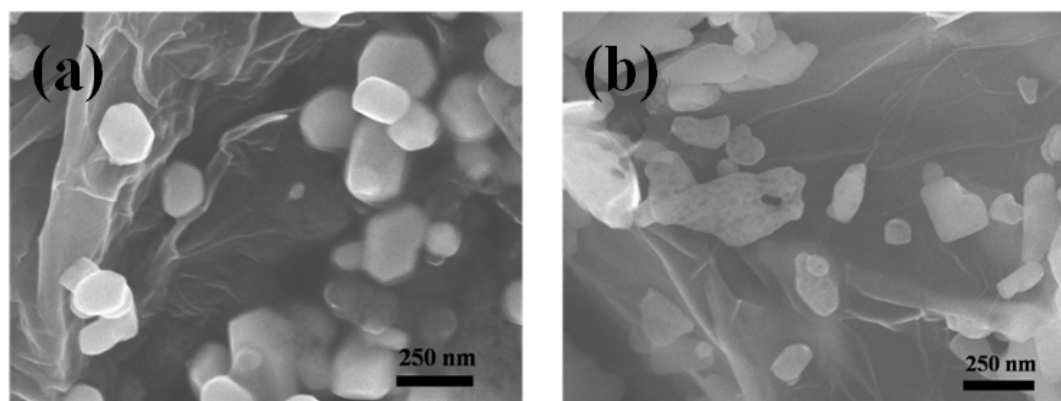


Figure S1 SEM images of  $\text{Cu}_2\text{O}$ /graphene (a) and Cu/graphene (b).

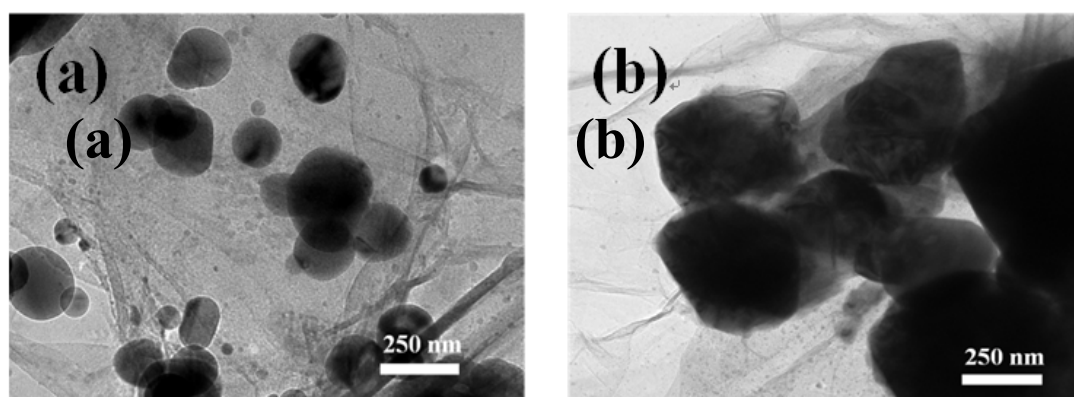
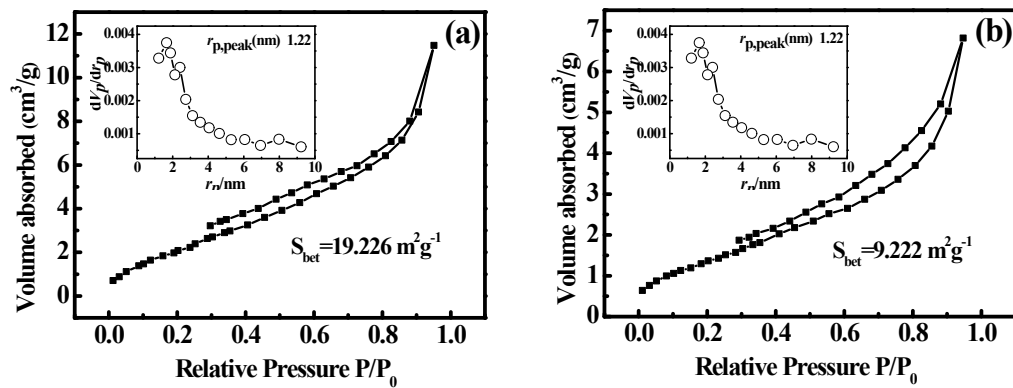
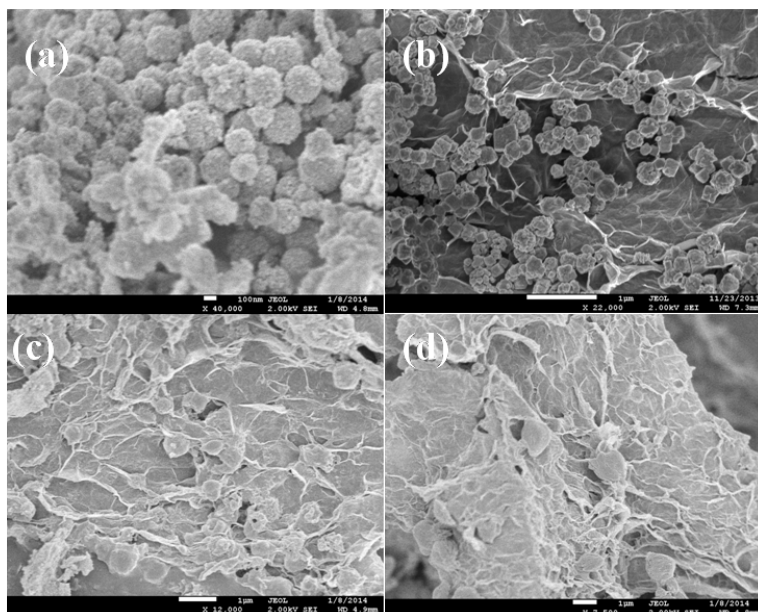


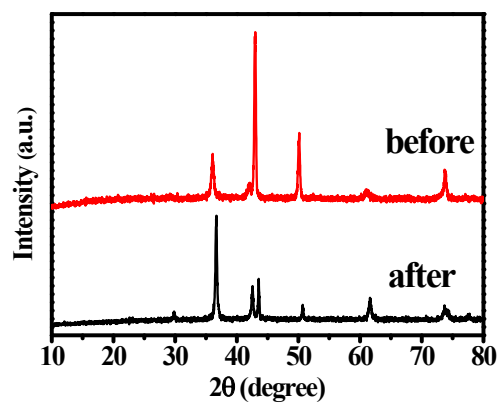
Figure S2 TEM images of  $\text{Cu}_2\text{O}$ /graphene (a) and Cu/graphene (b).



**Figure S3** Nitrogen adsorption–desorption isotherm of Cu<sub>2</sub>O/graphene (a) and Cu/graphene (b), inset shows the pore size distribution curves.



**Figure S4** SEM images of Cu-Cu<sub>2</sub>O/graphene with addition of different amount of GO added: 0.1% GN (a), 1.0% GN (b), 4.6% GN (c) and 8.0% GN (d).



**Figure S5** XRD patterns of the porous Cu-Cu<sub>2</sub>O/graphene before and after photoreaction for 2 h.