

Electronic Supplementary Information

Cu₂O-Directed in Situ Growth of Au Nanoparticles inside HKUST-1

Nanocages

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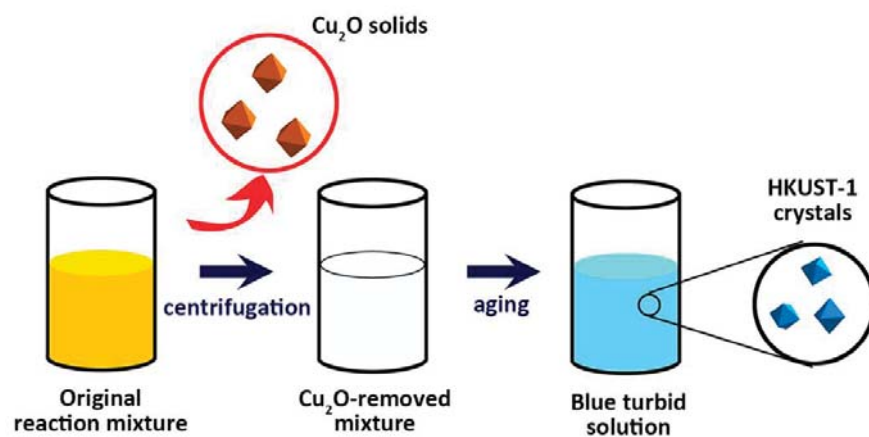


Fig. S1 Illustration of the evolution of Cu_2O -removed mixture: the colorless solution gradually converted to blue turbid solution after aging for some time.

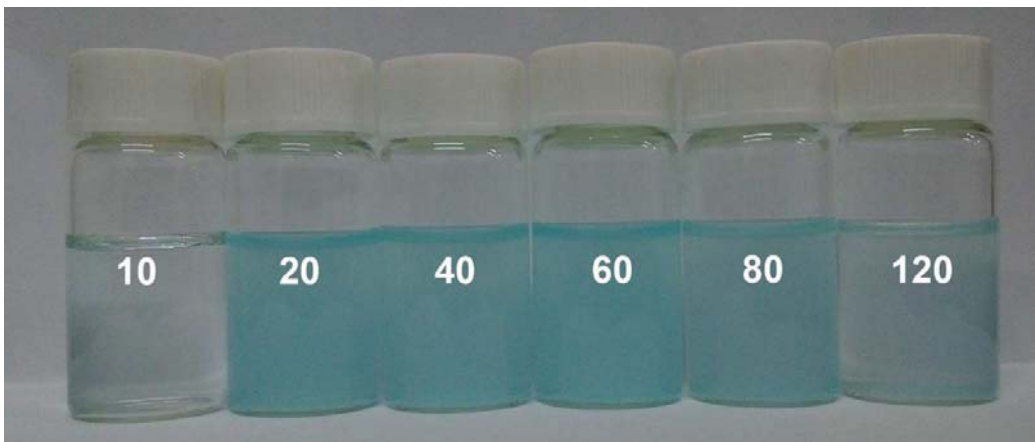


Fig. S2 The evolution after aging 3 hours of Cu₂O-removed mixture obtained from the original reaction mixture after reaction durations of 10 min, 20 min, 40 min, 60 min, 80 min and 120 min, respectively.

It is noted that the blue color of the first and last vial (obtained from the original reaction mixture after reaction durations of 10 min and 120 min, respectively) are washy than others indicating that the concentration of Cu²⁺ cations was low. It could be concluded that the dissolution of Cu₂O was slight in the initial 10 minutes while the construction of HKUST-1 crystals consumed large amounts of Cu²⁺ cations in solution after reaction durations of 120 minutes.

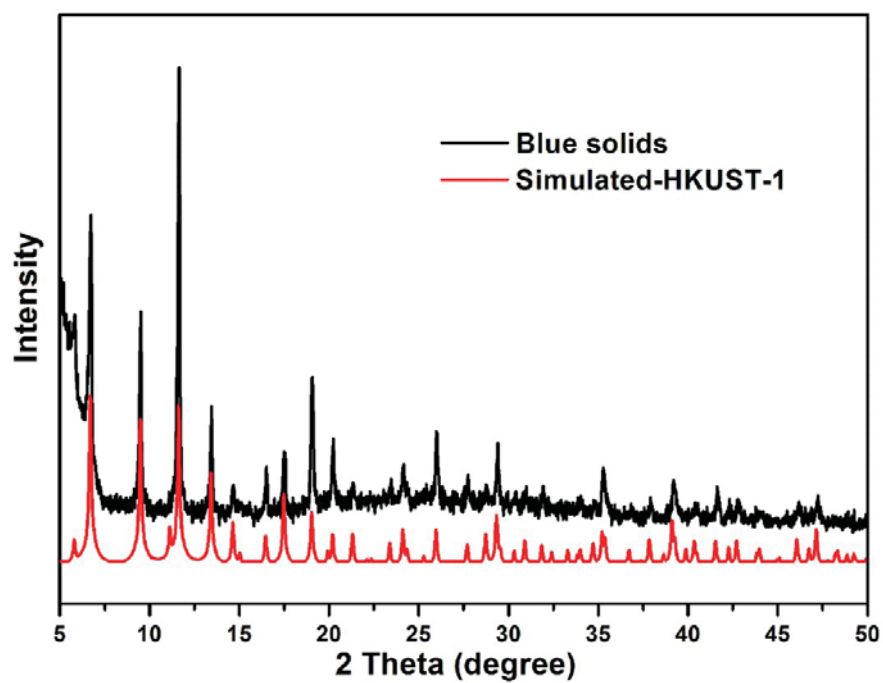


Fig. S3 XRD spectrum of the blue solids obtained from the Cu_2O -removed mixture after aging.

XRD spectrum suggests that the blue component are HKUST-1 crystals.

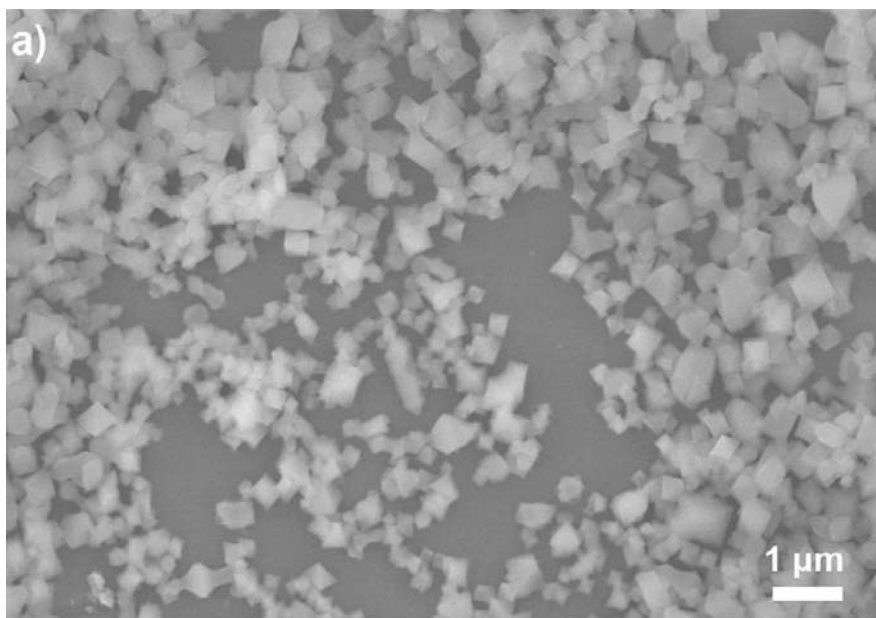


Fig. S4 SEM image of the blue solids obtained from the Cu_2O -removed mixture after aging.

SEM image suggests that the blue component are HKUST-1 crystals.

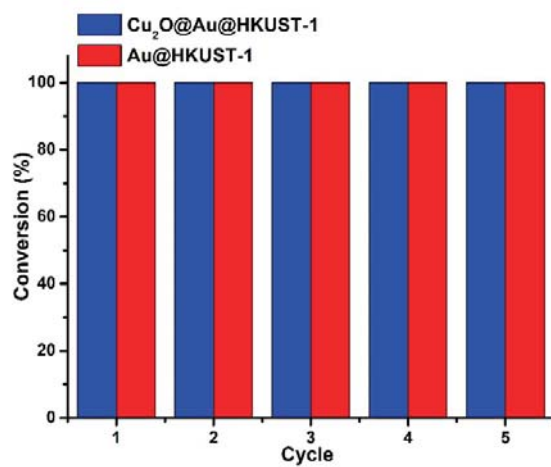


Fig. S5 Activity recyclability tests for 5 cycles of CO oxidation under the same conditions over $\text{Cu}_2\text{O@Au@HKUST-1}$ sandwich core-shell heterostructures and Au@HKUST-1 balls-in-cage heterostructures.

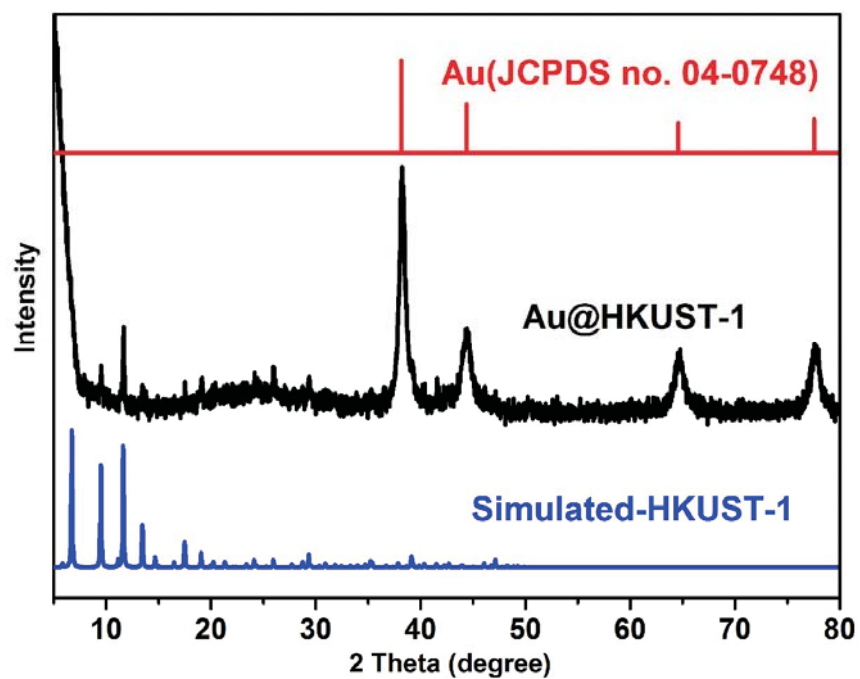


Fig. S6 XRD spectra of standard Au, simulated HKUST-1 and Au@HKUST-1 balls-in-cage heterostructures after catalytic reaction of CO for two hours at 190 °C.