Electronic Supplementary Information for

Facile construction of bowknot-like CuO architectures for improved xylene gas sensing properties

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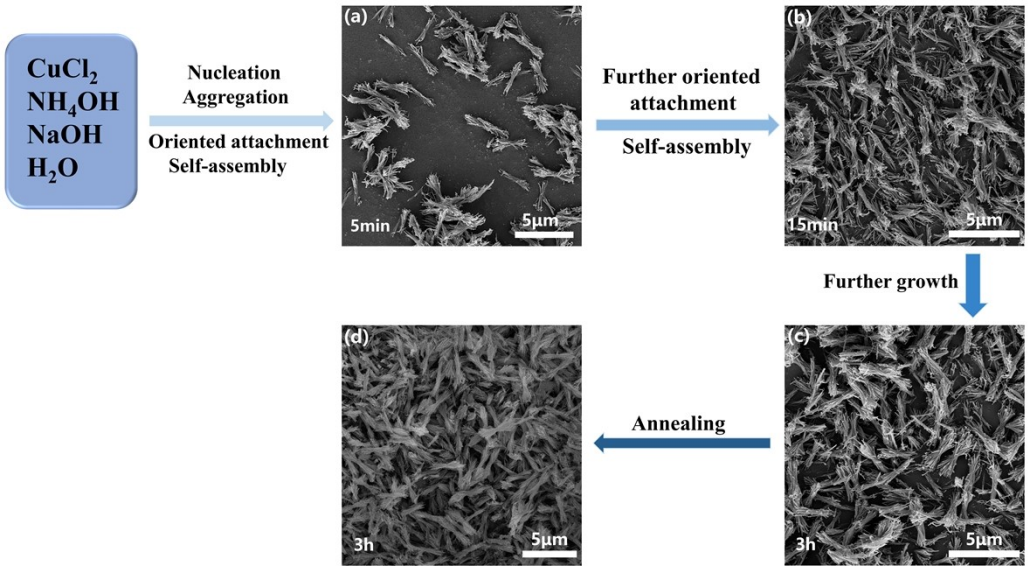

Fig. S1 The growth mechanism of the bowknot-like CuO precursors and subsequent annealing process.

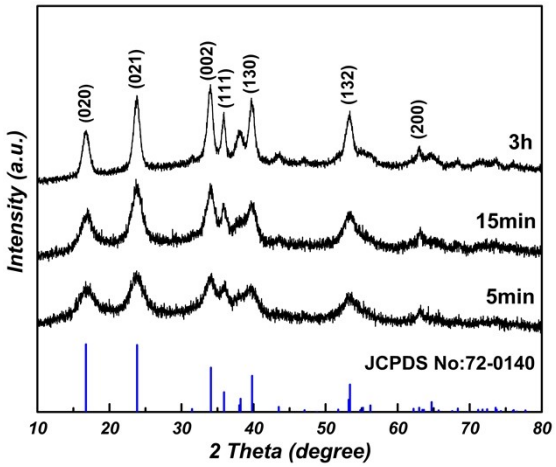

Fig. S2 The XRD patterns of the bowknot-like CuO precursors under different reaction time.

When 1 mL ammonia solution is added to the copper chloride dihydrate solution, the mixed solution becomes dark blue, but no precipitation appears. After adding the sodium hydroxide solution, the mixed solution appears precipitated and turns into a suspension. Based on the observed experimental phenomena and SEM images of the precursors, a plausible growth mechanism is proposed. At an early stage of the reaction, Cu^{2+} can react with available $OH^-$to produce $Cu(OH)_2$ nuclei. The $Cu(OH)_2$ nuclei would rapidly aggregate together to form nanowires and subsequently nanowire assembled sheaf-like structures (the embryonic form of bowknot-like structures, JCPDS no. 72-0140) by oriented attachment and self-assembly processes

(Fig. S1a and Fig. S2 5 min). After that, the number of nanowires in sheaf-like structures increases while more sheaf-like structures gradually grow into bowknot-like structures by further oriented attachment and self-assembly processes (Fig. S1b and Fig. S2 15 min). After 3h of the reaction, mature $Cu(OH)_2$ bowknot-like structures have been formed (Fig. S1c and Fig. S2 3h). The final black CuO bowknot-like structures are obtained by annealing blue $Cu(OH)_2$ precursors.

References

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