

## Electronic Supplementary Information

### Transformation of mesoporous Cu/Cu<sub>2</sub>O into porous Cu<sub>2</sub>O nanowires in ethanol

Yu Ren,<sup>a,c,\*</sup> Zhen Ma,<sup>b,\*</sup> and Peter G. Bruce,<sup>c</sup>

<sup>a</sup> National Institute of Clean-and-low-carbon Energy, Beijing, 102209, China. Fax: +(00)86 (0)1057339649-9664; Tel: +(00)86 (0)1057339664.

<sup>b</sup> Department of Environmental Science and Engineering, Fudan University, Shanghai 200433, P.R. China.

<sup>c</sup> EaStCHEM, School of Chemistry, University of St. Andrews, St. Andrews, Fife KY16 9ST, U.K. Fax: +(00)44 (0)1334 463808; Tel: +(00)44 (0)1334 463825.

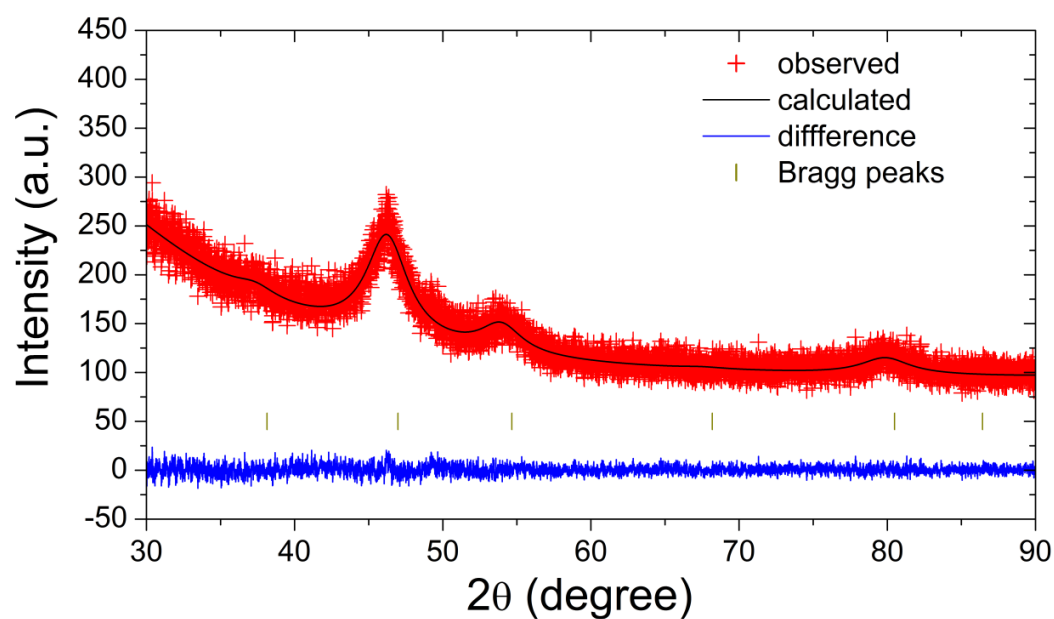


Fig. S1 Rietveld refinement of the XRD pattern of porous Cu<sub>2</sub>O nanowires.

Table 1 Rietveld refinement results of XRD pattern of porous Cu<sub>2</sub>O nanowires

Name	X	Y	Z	Ui/Ue	Fraction
Cu1	0.00000	0.00000	0.00000	0.068(6)	1.0000
O2	0.25000	0.25000	0.25000	0.020(9)	1.0000

Space group: Pn-3m,  $a = 4.2709(14)$  Å,  $V = 77.90(4)$  Å<sup>3</sup>,  $R_{wp} = 0.1043$ ,  $R_p = 0.081$

### **NO adsorption and desorption at room temperature (298 K)**

The adsorption/desorption of NO gas in porous Cu<sub>2</sub>O was measured using a gravimetric adsorption system. A CI instruments microbalance was thermally stabilized to eliminate the effect from external environment. The microbalance has a sensitivity of 0.1 µg and reproducibility of 0.01% of the load. The pressure of the adsorption system was monitored by two BOC Edwards Active gauges in the ranges of  $1 \times 10^{-8}$ – $1 \times 10^{-2}$  and  $1 \times 10^{-4}$ – $1 \times 10^3$  mbar, respectively. The sample (~130 mg) was initially outgassed at 388 K under  $1 \times 10^{-4}$  mbar, until no further weight loss was observed. The sample temperature was then decreased to 298 K and kept constant by a circulation water bath with temperature accuracy  $\pm 0.02$  K. The counterbalance temperature was kept the same as that of the sample to minimize the influence of temperature difference on weight readings, and the sample temperature was monitored using a K type of thermocouple, located close to the sample bucket (< 5 mm). The variation in sample temperature was minimal (< 0.1 K) throughout the experiment. Nitric oxide gas was introduced into the adsorption system until the desired pressure was achieved, and the mass uptake of the sample was measured as a function of time until the adsorption equilibrium was achieved. In this manner an adsorption isotherm was collected by incrementally increasing the pressure and noting the mass gain of the sample after equilibrium was reached. The desorption of nitric oxide gas adsorbed in the samples was performed by gradually decreasing the system pressure to a desired value (until  $2 \times 10^{-2}$  mbar).

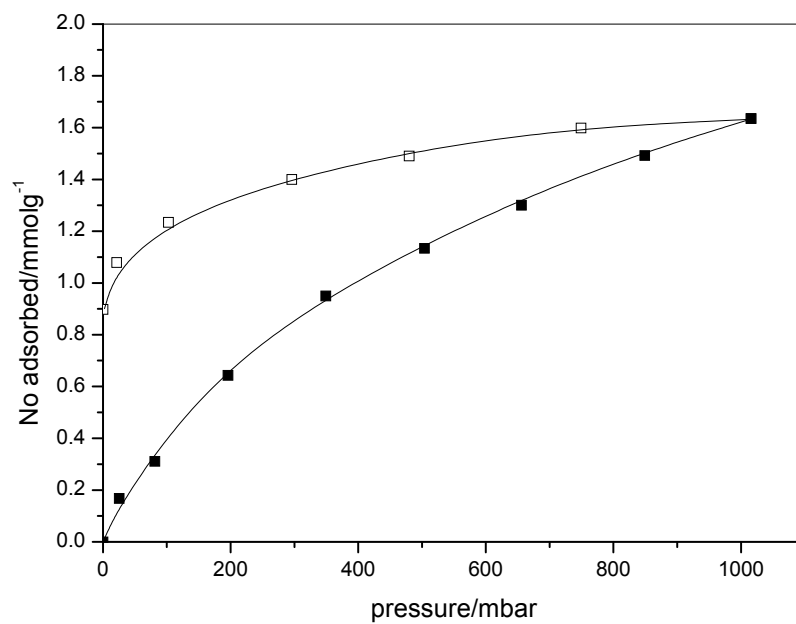


Figure S2 NO adsorption and desorption on porous Cu<sub>2</sub>O nanowires at 298 K.

Table S2 the standard Gibbs formation energy of different chemicals

Molecules	state	Molar Gibbs formation energy (kJ/mol)
Cu <sub>2</sub> O	Solid	-149.0
Cu	Solid	0
CuO	Solid	-129.7
C <sub>2</sub> H <sub>5</sub> OH	Liquid	-174.8
CH <sub>3</sub> CHO	Liquid	-127.6
CH <sub>3</sub> COOH	Liquid	-390.2
O <sub>2</sub>	Gas	0
H <sub>2</sub> O	Liquid	-237.14

