

## Supporting information

### The study on acidity of sulfated CuO layers grown by surface reconstruction of Cu<sub>2</sub>O exposed with specific facets

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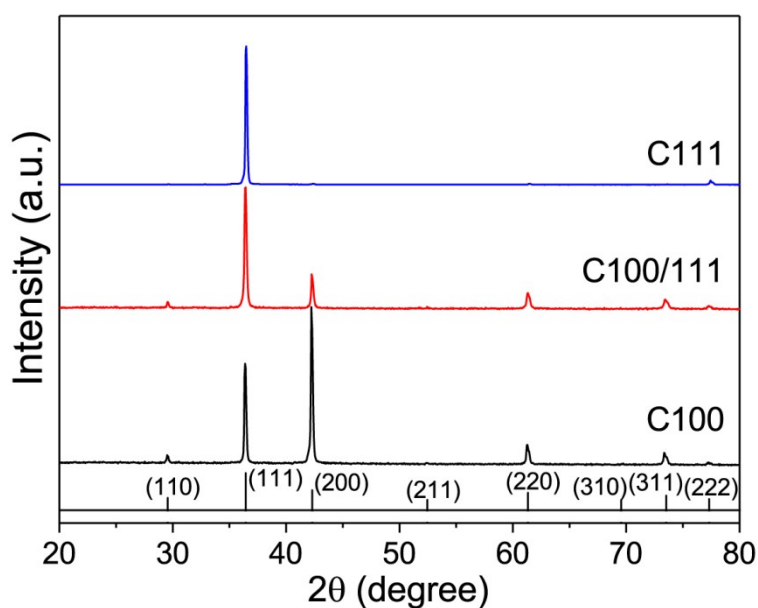


Fig S1 XRD patterns of pristine Cu<sub>2</sub>O samples.

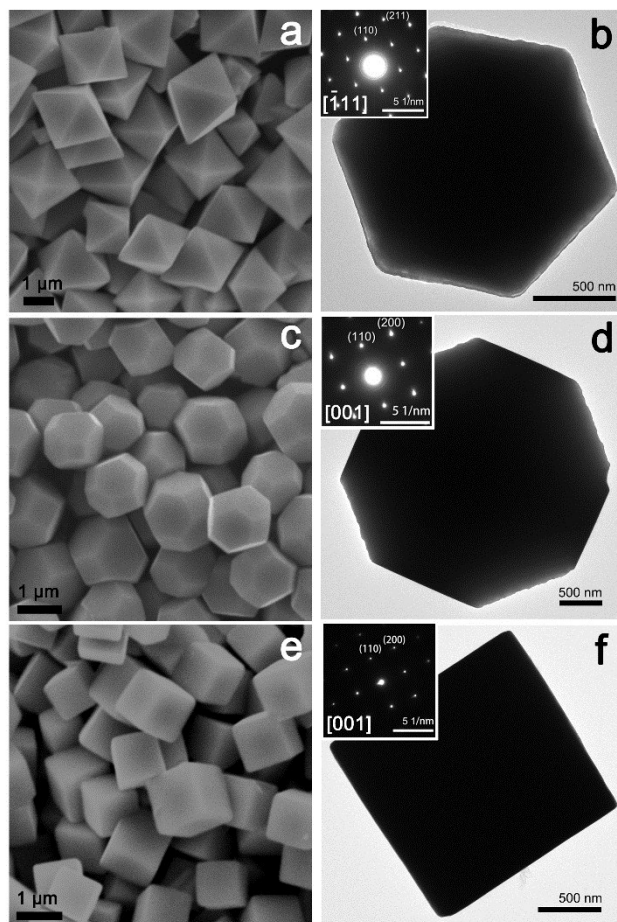


Fig S2 SEM and TEM images of (a, b) C111, (c, d) C100/111, (e, f) C100. The insets of b, d, f are corresponding SAED patterns.

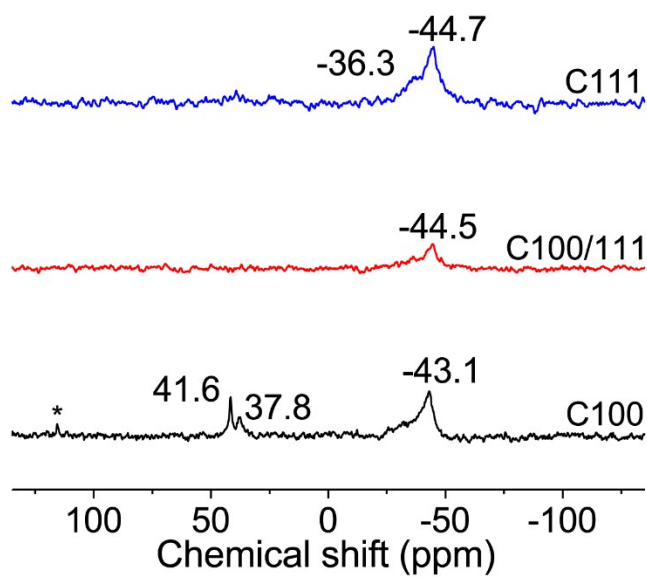


Fig S3  $^{31}\text{P}$  MAS NMR spectra of pristine  $\text{Cu}_2\text{O}$  samples adsorbed with TMP.

Table S1 Acid properties of pristine Cu<sub>2</sub>O characterized by <sup>31</sup>P MAS NMR

Samples	Brønsted acid density ( $\mu\text{mol}\cdot\text{g}^{-1}$ )	Lewis acid density ( $\mu\text{mol}\cdot\text{g}^{-1}$ )	Total acid density ( $\mu\text{mol}\cdot\text{g}^{-1}$ )
C111	Not observed	11.4	11.4
C100/111	Not observed	7.30	7.30
C100	Not observed	14.7	14.7

Table S2 Chemical shift of all peaks located between -25 to -50 ppm in <sup>31</sup>P MAS NMR spectra of SCO samples after deconvolution

	SCO111 (ppm)	SCO100/111 (ppm)	SCO100 (ppm)
Type A Lewis acid	-25.0	-25.2	-26.1
	-29.9	-30.1	-31.0
	-34.8	-35.0	-35.9
	-39.7	-39.9	-40.8
Type B Lewis acid	-29.9	-30.2	-30.8
	-34.9	-35.2	-35.8
	-39.9	-40.2	-40.8
	-44.9	-45.2	-45.8
Type C Lewis acid	-31.8	-32.2	-32.3
	-36.6	-37.0	-37.1
	-41.4	-41.8	-41.9
	-46.2	-46.6	-46.7

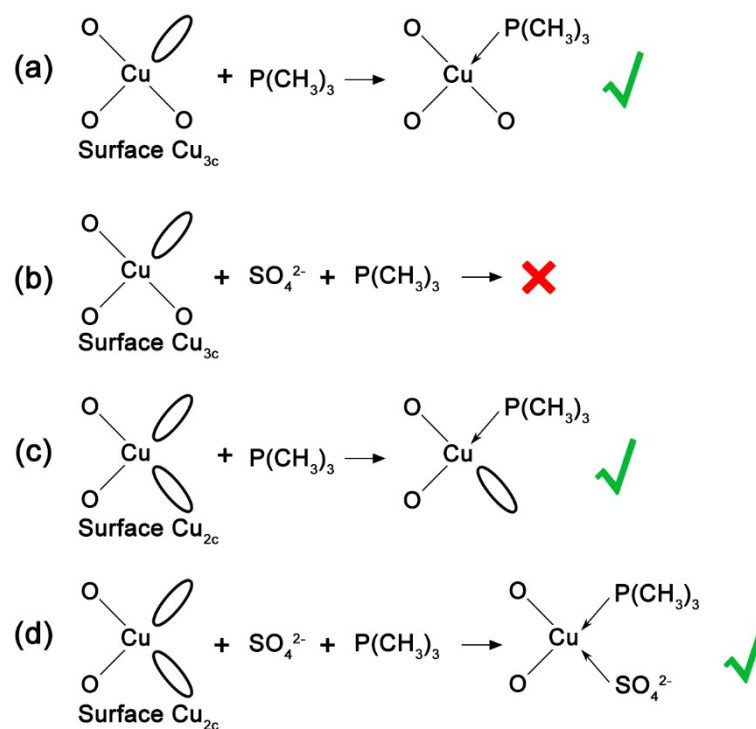


Fig. S4 Analysis of Lewis acid sites on SCO samples.

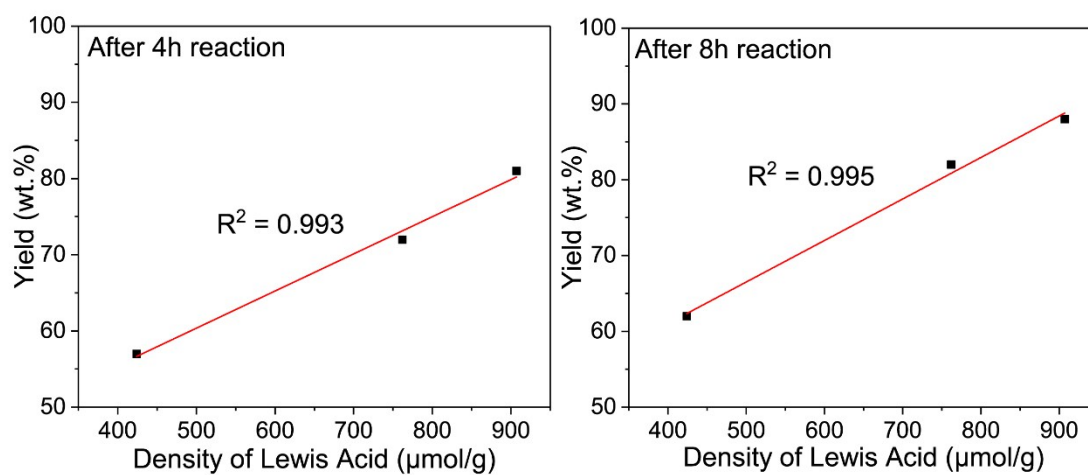


Fig. S5 Correlation between total density of Type B and C Lewis acid and yield of coumarin on SCO samples.