

## Supporting Information

### Comparison of Au-Ce and Au-Cu interaction over Au/CeO<sub>2</sub>-CuO catalysts for preferential CO oxidation

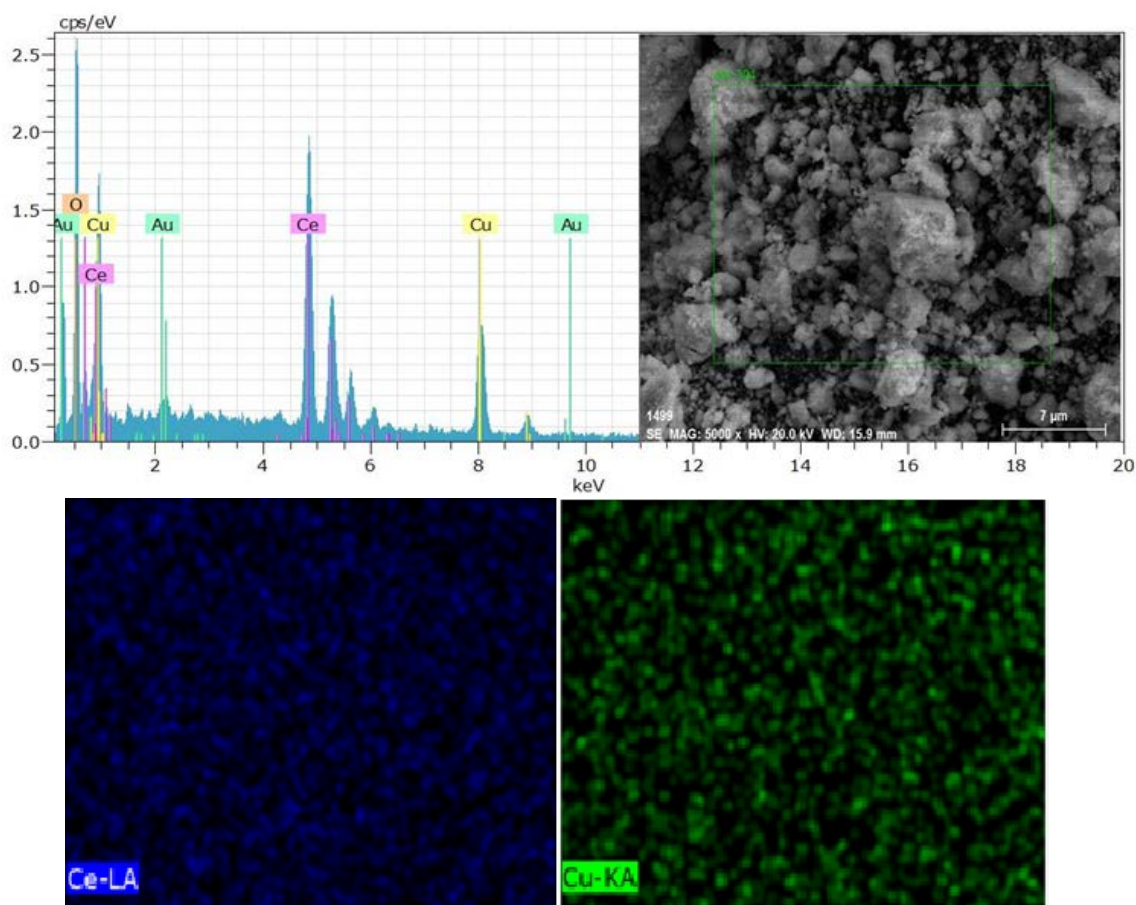
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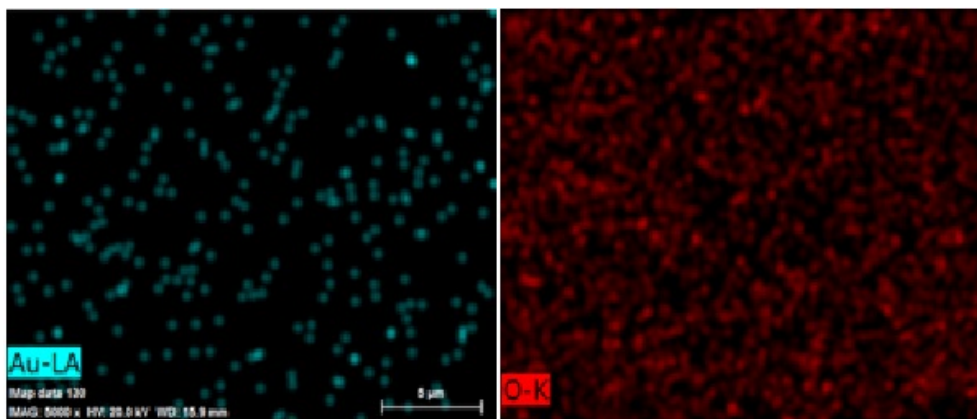
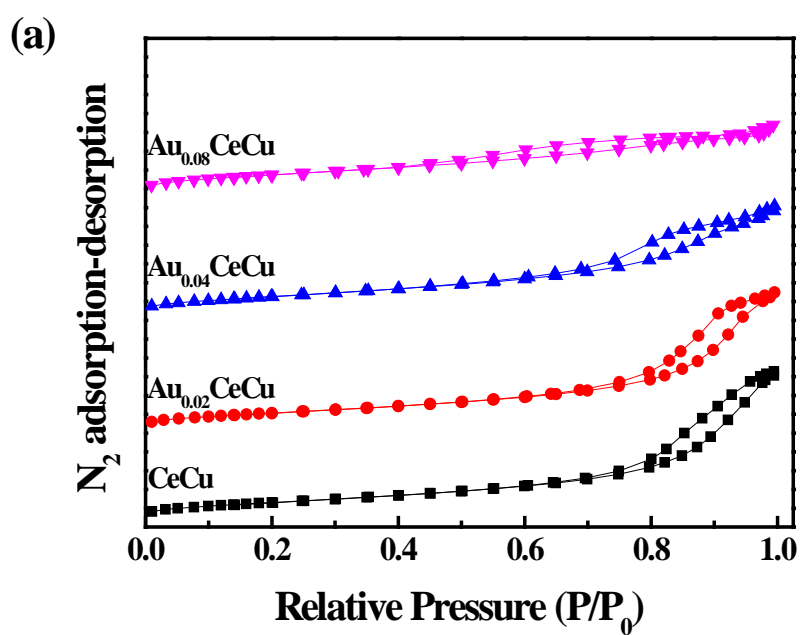
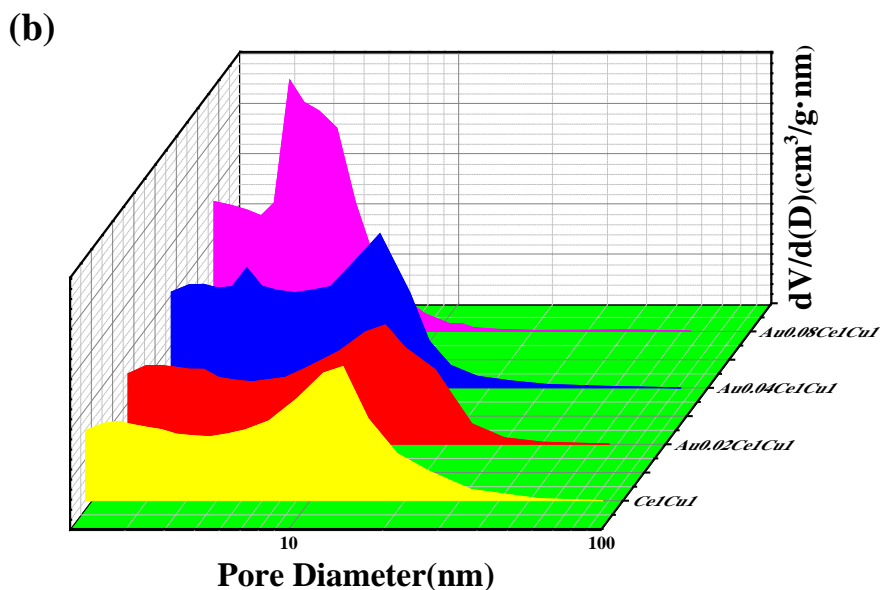


Fig. S1. SEM-EDS images of the  $\text{Au}_{0.04}/\text{CeO}_2\text{-CuO}$  catalyst.



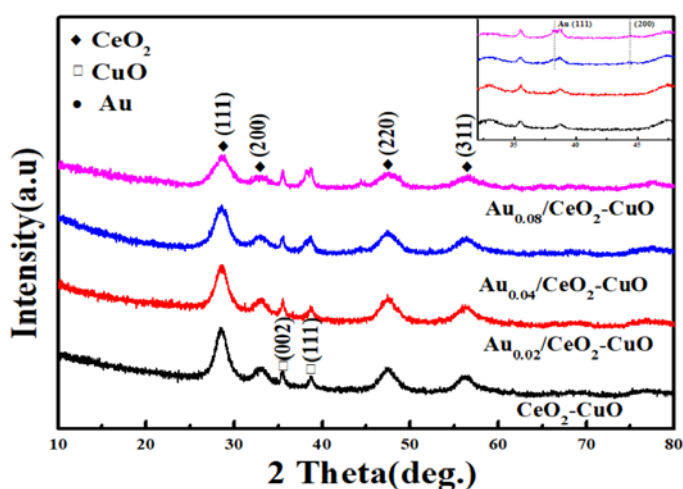


**Fig. S2.**  $N_2$  adsorption-desorption isotherms and pore size distribution curves of the  $CeO_2$ -CuO and Au/  $CeO_2$ -CuO catalysts.

The  $N_2$  adsorption-desorption isotherms correspond to type IV in the relative pressure ( $p/p_0$ ) range of 0.5–1.0 for the as-prepared catalysts, suggesting that the catalysts possess the mesoporous structure. Moreover, the pore size distribution curves indicate that the pore sizes of the catalysts decrease with increasing Au loading.

### XRD results for the repeated measurements:

We have redone the synthesis and measured XRD. The results are presented as follow.



**Fig. S3** XRD patterns of the  $CeO_2$ -CuO and Au/ $CeO_2$ -CuO catalysts.

The crystallite sizes of CeO<sub>2</sub> are 5.0, 4.9, 4.7 and 4.4 nm, respectively. The Crystallite sizes of CuO are 16.9, 19.7, 21.6 and 22.4 nm, respectively. The results show that gold concentration indeed affects the sizes of CeO<sub>2</sub> and CuO. And the change in size is basically consistent with the trend described by XRD analysis.

**Table S1** Literature data for PROX reaction over the different catalysts

Catalyst	Operating conditions	GHSV (mL h <sup>-1</sup> g <sup>-1</sup> <sub>cat</sub> )	T <sub>50</sub> (°C)	T <sub>100</sub> (°C)	CO <sub>2</sub> selectivity in T <sub>100</sub> (%)	Width
Au <sub>0.08</sub> /CeO <sub>2</sub> -CuO this work	1% CO, 1% O <sub>2</sub> , 50% H <sub>2</sub> in N <sub>2</sub>	40000	60	95	82	60
Au-CuO <sub>x</sub> /CeO <sub>2</sub> <sup>S1</sup>	2 % CO, 2 % O <sub>2</sub> , 70 % H <sub>2</sub> , in He	60000	55	100	50	80
Classical Cu <sub>x</sub> O/CeO <sub>2</sub> <sup>S1</sup>	2 % CO, 2 % O <sub>2</sub> , 70 % H <sub>2</sub> , in He	60000	80	120	48	60
Au <sub>3</sub> Cu <sub>1</sub> /CeO <sub>2</sub> -R <sup>S2</sup>	1.0% CO, 1.0 % O <sub>2</sub> , 50% H <sub>2</sub> in He	240000	50	125	50	50
Au-Cu/SBA-15 <sup>S3</sup>	1% CO, 1% O <sub>2</sub> , in He	20000	0	25	--	--
Au/CuO-CeO <sub>2</sub> <sup>S4</sup>	1.33% CO, 1.33% O <sub>2</sub> , 65.33% H <sub>2</sub> in He	30000	28	50	63	30

## References

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