

Supporting information for

**Trace CO elimination in H₂-rich streams with wide operation
temperature window: Co deposited CuO-CeO₂ catalysts**

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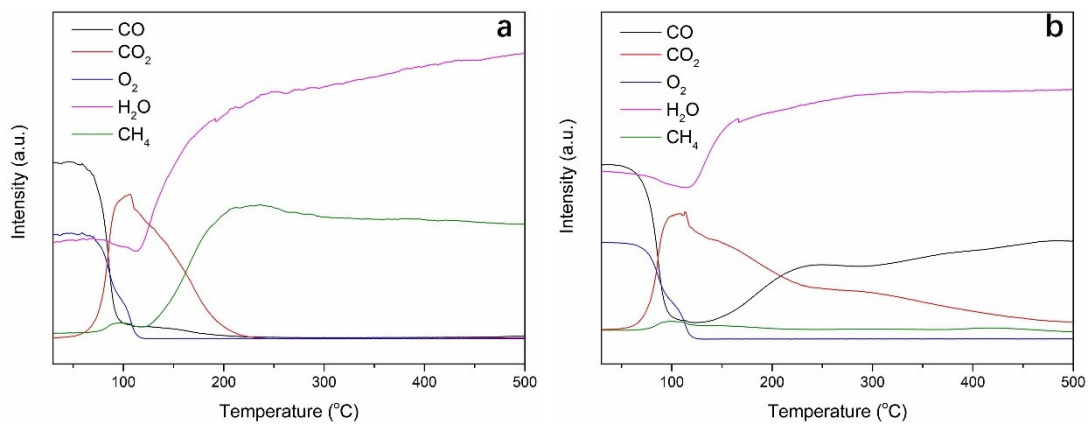


Fig. S1 TPSR curves of (a) 1Co-CuCe and (b) CuCe.

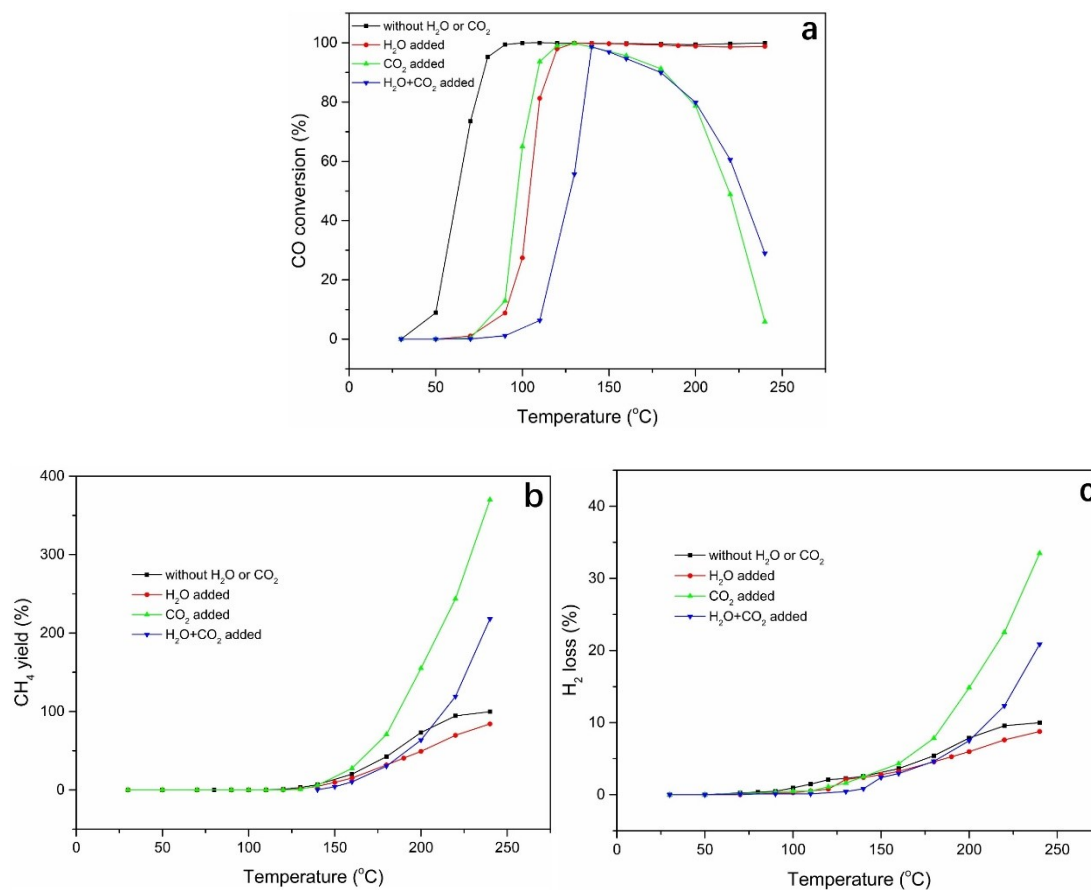


Fig. S2 Catalytic performance of 1Co-CuCe catalyst with the presence of H₂O or/and CO₂ in the feed stream. (a) CO conversion. (b) CH₄ yield. (c) H₂ loss.

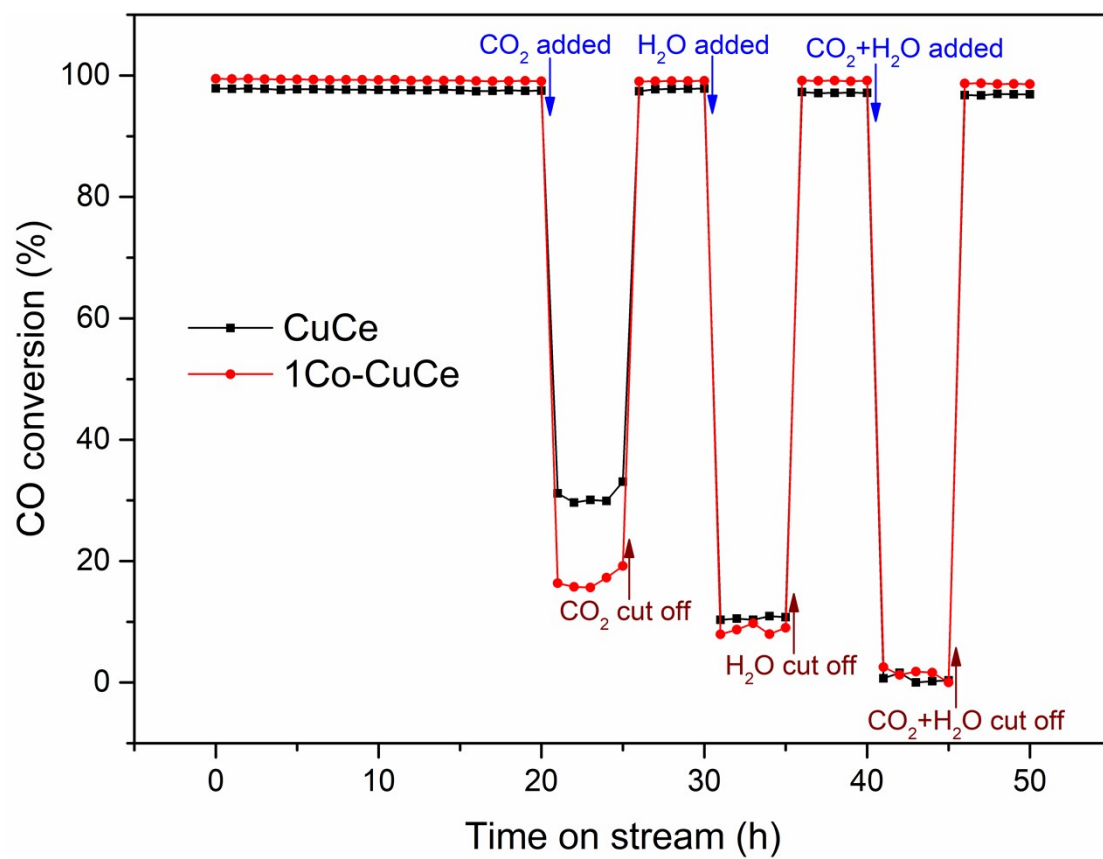


Fig. S3 Stability of CuCe and 1Co-CuCe catalysts under 50 h of CO-PROX reaction with H_2O and/or CO_2 added and cut off.

Table S1 Co₃O₄ structure parameters of the Co deposited CuO-CeO₂ catalysts.

Catalyst	Lattice parameter of Co ₃ O ₄ (Å)	Grain size ^a (Å)	Microstrain ^a (10 ⁻³)
1/10Co-CuCe	-	-	-
1/4Co-CuCe	8.0836	128.1/134.9/120.7	0.53/0.61/1.05
1/2Co-CuCe	8.0812	218.2/210.0/200.5	0.41/0.35/0.28
3/4Co-CuCe	8.0804	291.6/281.8/266.6	0.96/0.71/0.17
1Co-CuCe	8.0829	299.2/285.5/268.5	0.70/0.50/0.12
5/4Co-CuCe	8.0827	283.3/280.1/268.4	1.18/1.04/0.87

^aThe crystalline size and microstrain of the three crystal planes of Co₃O₄ basic grain, which are {111}, {110} and {311} from left to right.

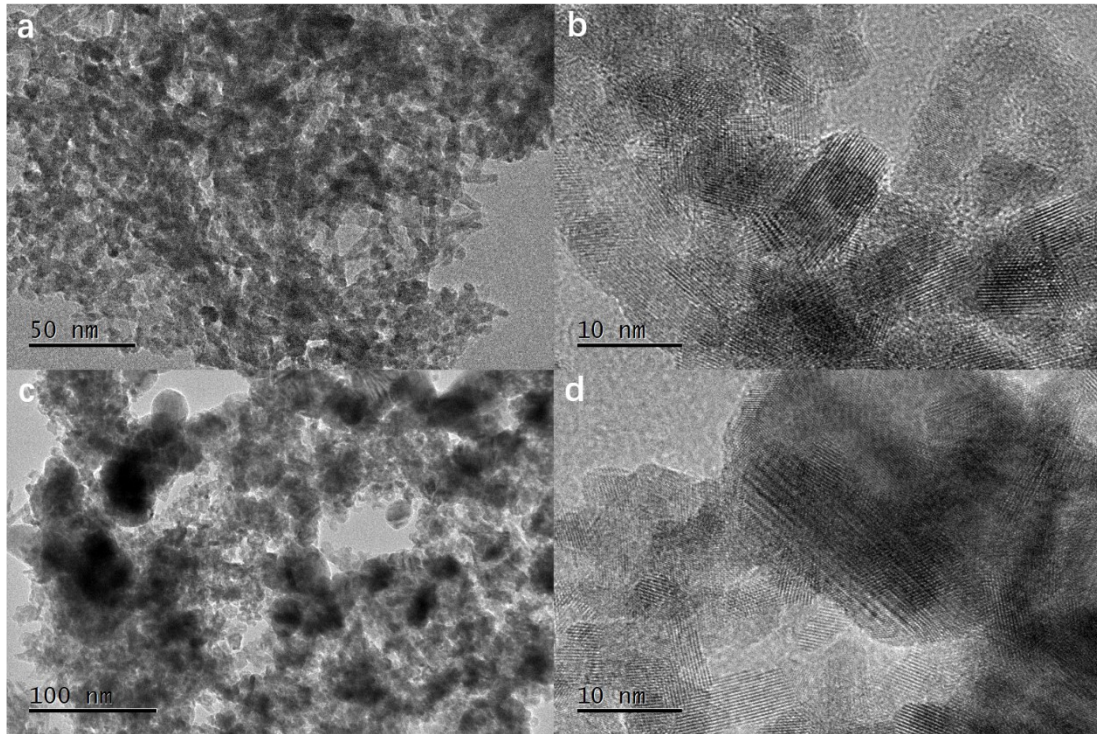


Fig. S4 HRTEM images of CuCe (a, b) and 1Co-CuCe (c, d) catalysts after catalytic performance evaluation.

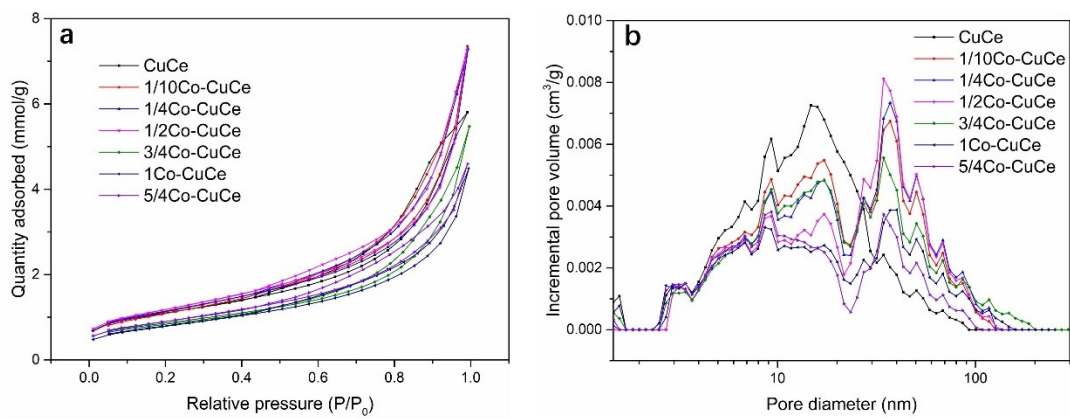


Fig. S5 N₂ adsorption-desorption isotherms (a) and BJH desorption pore size distribution curves (b) of the Co deposited CuO-CeO₂ catalysts.

Table S2 Reduction temperature and H₂ consumption of the H₂-TPR peaks.

Catalyst	Peak α		Peak β		Peak γ		Peak δ		Peak ω	
	Tem.	H ₂ cons.	Tem.	H ₂ cons.	Tem.	H ₂ cons.	Tem.	H ₂ cons.	Tem.	H ₂ cons.
	(°C)	($\mu\text{mol g}^{-1}$)	(°C)	($\mu\text{mol g}^{-1}$)	(°C)	($\mu\text{mol g}^{-1}$)	(°C)	($\mu\text{mol g}^{-1}$)	(°C)	($\mu\text{mol g}^{-1}$)
CuCe	166	485	189	463	200	391	-	-	-	-
1/10Co-CuCe	164	527	189	513	199	342	232	448	-	-
1/4Co-CuCe	161	365	193	804	-	-	230	1335	-	-
1/2Co-CuCe	160	322	198	1267	-	-	259	2602	-	-
3/4Co-CuCe	154	294	189	874	-	-	260	3071	-	-
1Co-CuCe	161	312	194	1097	-	-	266	2029	-	-
5/4Co-CuCe	164	299	192	633	-	-	278	3890	325	944

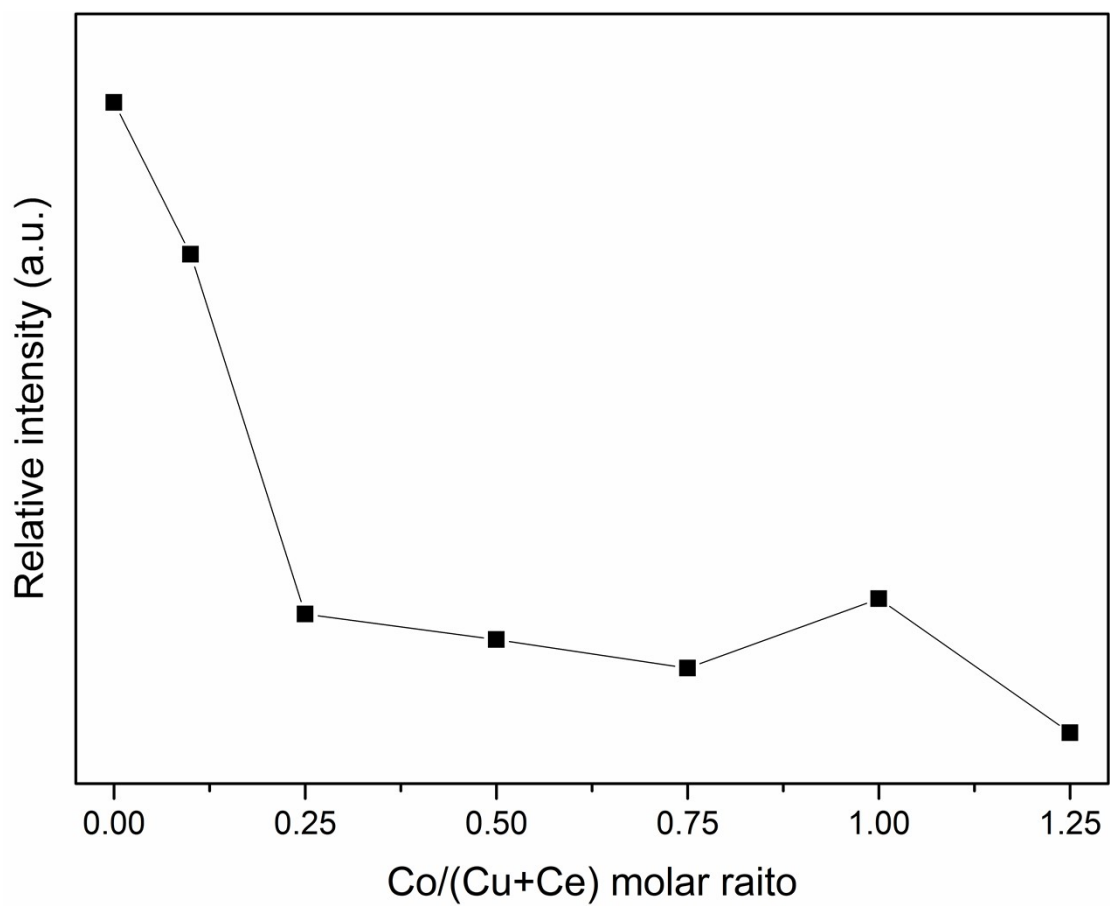


Fig. S6 Relative intensity of Cu⁺-carbonyl peak at 90 °C of *in situ* DRIFTS spectra of the Co deposited CuO-CeO₂ catalysts.