Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Metal oxide/CeO_2 nanocomposites derived from Ce-BTC adsorbing with metal acetylacetonate complexes for preferential oxidation of carbon monoxide

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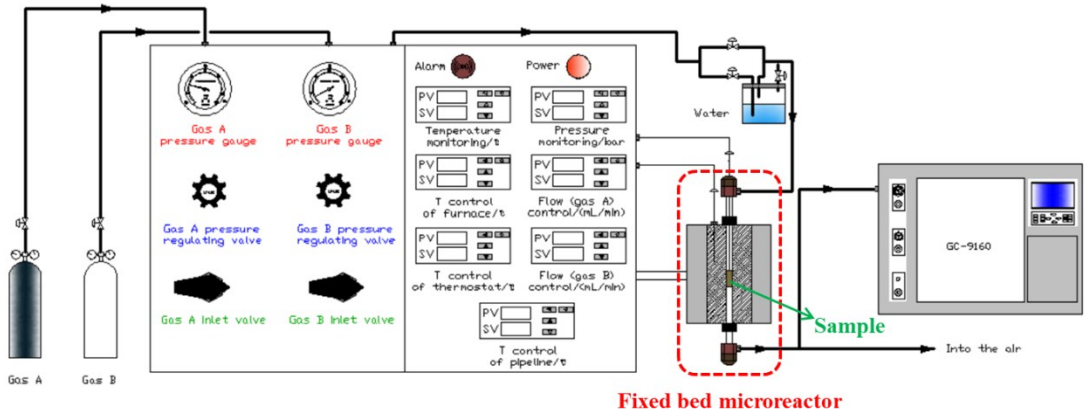

Fig. S1. The reactor of CO oxidation

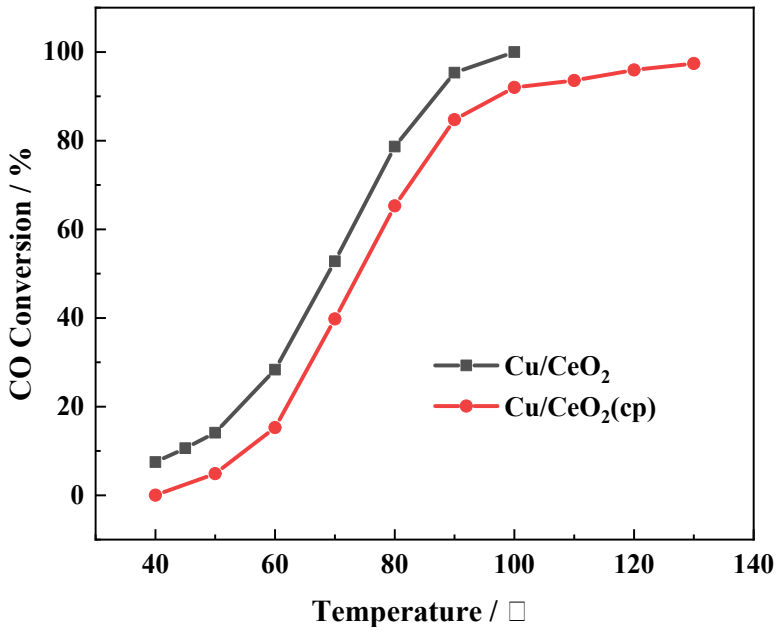

Fig. S2. The catalytic activity comparison of Cu/CeO_2 and Cu/CeO_2(cp) in dry condition. (The preparation method of Cu/CeO_2(cp): The Cu/CeO_2(cp) was prepared by the conventional co-precipitation method. The molar ratio of Cu to Ce in the form of $Cu(NO_3)_2$ and $Ce(NO_3)_3$ was fixed at 1:8.6. In a typical fabrication, 1 mmol of $Cu(NO_3)_2 \cdot 3H_2O$ and 8.6 mmol of $Ce(NO_3)_3 \cdot 6H_2O$ were added to 50 mL of water under sonication for 10 min. Then, the above solution was heated to 45 °C under stirring. Subsequently, 10 mL of an aqueous NaOH solution (4 mol/L) was added dropwise and the mixture was further stirred for 8 h. After the reaction, the product was collected by centrifugation, washing twice with water and once with ethanol, and drying at 60 °C for 10 h. Finally, the sample was calcined at 500 °C for 3 h.)

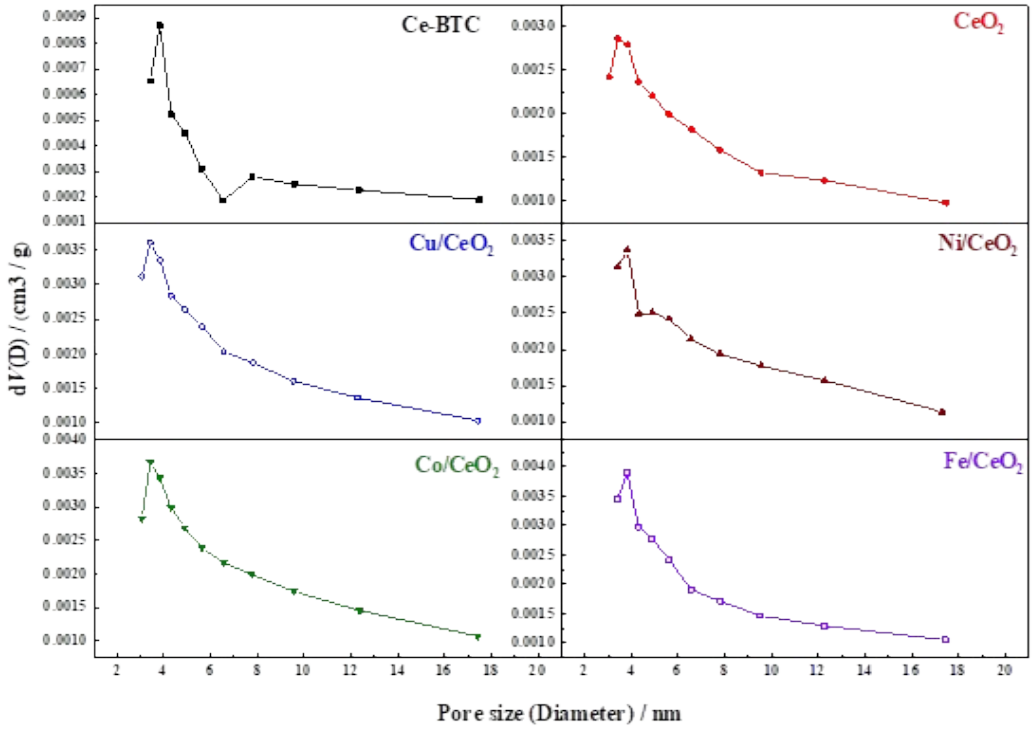

Fig. S3. The pore size distribution of prepared samples

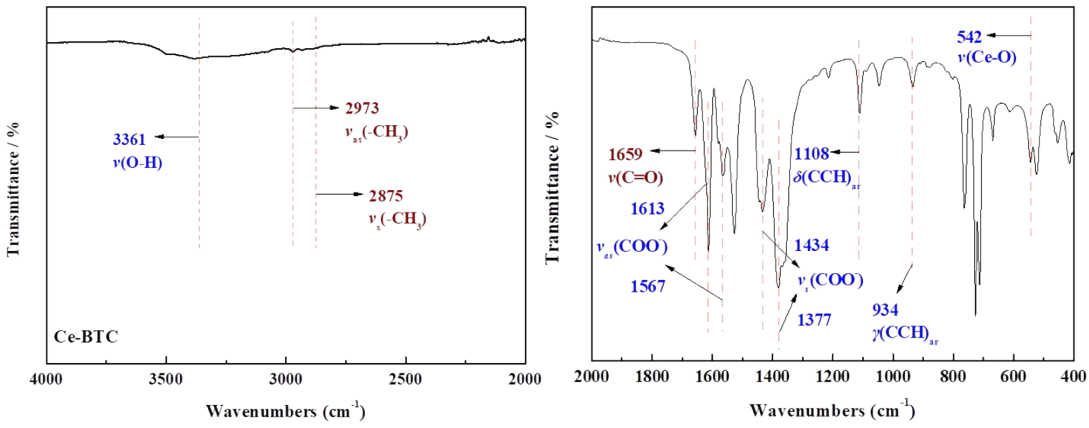

Fig. S4. The FT-IR of Ce-BTC

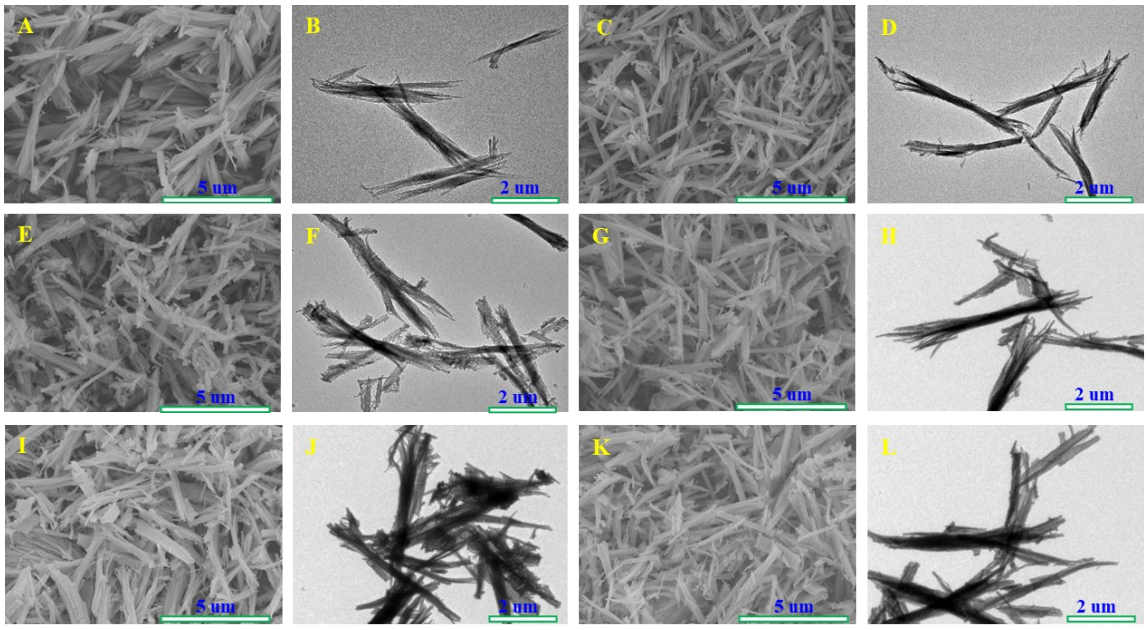

Fig. S5. (A,B) SEM and TEM images of Ce-BTC, (C,D) SEM and TEM images of CeO_2, (E,F) SEM and TEM images of Cu/CeO_2, (G,H) SEM and TEM images of Ni/CeO_2, (I,J) SEM and TEM images of Co/CeO_2, (K,L) SEM and TEM images of Fe/CeO_2.

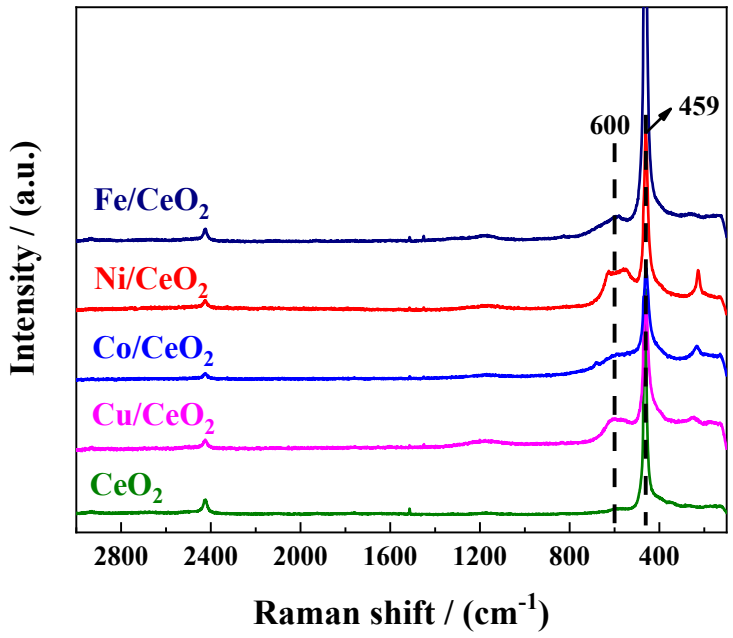

Fig. S6. The Raman spectrum of prepared samples

Table S1. Catalytic performance comparison of various catalysts for CO oxidation reaction

Catalyst	Preparation method	Operating parameters	T_{100} / ℃	Ref
Cu/CeO_2	Thermolysis of MOF	Catalyst: 130 mg, gas: 95.00 vol% N_2, 4.00 vol% O_2, and 1.00 vol% CO, flow rate: 20 mL/min	100	This work
		Catalyst: 130 mg, gas: 90.25 vol% N_2, 5.00 vol% H_2O, 3.80 vol% O_2, and 0.95 vol% CO, flow rate: 20 mL/min	140	
		Catalyst: 130 mg, gas: 75.00 vol% H_2, 23.75 vol% N_2, 1.00 vol% O_2, 0.25 vol% CO, flow rate: 40 mL/min	110	
		Catalyst: 130 mg, gas: 71.25 vol% H_2, 22.55 vol% N_2, 5.00 vol% H_2O, 0.96 vol% O_2, and 0.24 vol% CO, flow rate: 40 mL/min	140	
$CuO-CeO_2$	Co-precipitation	Catalyst: 50 mg, gas: 1 vol% CO, 1 vol% O_2, 20 vol% H_2O, 13.5 vol% CO_2, 50 vol% H_2, and He balanced, flow rate: 100 mL/min	120	1
CeO_2/CuO	Impregnation	Catalyst: 100 mg, gas: 1.5 vol% O_2, 1.5 vol% CO, 55 vol% H_2, and N_2 balanced, space velocity: 40000 mL/g/h	125	2
CeO_2/Co_3O_4	Impregnation	Catalyst: 500 mg, gas: 10% O_2/He, 4% CO/He, flow rate: 20 mL/min.	135	3
$CeO_2-Al_2O_3$	Gel combustion	Catalyst: 200 mg, gas: 570 ppm CO, 20 vol% O_2, and N_2 balanced, flow rate: 1000 mL/min	160	4
Ni-Co bimetal oxides	Co-impregnation	Catalyst: 200 mg, gas: 2 vol% CO, 20 vol% O_2, and Ar balanced, space velocity: 600 mL/g/h	100	5
ZIF-67@LDO	Thermolysis of MOF	Catalyst: 50 mg, gas: 1 vol% CO, 10 vol% O_2, and N_2 balanced, flow rate: 60 mL/min	140	6
$Cu/CeO_2-Nb_2O_5$	Wetness impregnation	Catalyst: 150 mg, gas: 20 vol% H_2, 2 vol% CO, 2 vol% O_2, 5% H_2O, and balanced He, flow rate: 50 mL/min	135	7
Mn-Cu bimetal oxides	Thermolysis of MOF	Catalyst: 50 mg, gas: 95.00 vol% N_2, 4.00 vol% O_2, and 1.00 vol% CO, flow rate: 20 mL/min	170	8

CoCe	Impregnation	Catalyst: 500 mg, gas: 97.00 vol% N_2, 2.00 vol% O_2, and 1.00 vol% CO, space velocity: 30000 mL/g/h	255	9
$Mn_5Co_1O_x$-400	Co-impregnation	Gas: 1 vol% CO in air	275	10

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