Supporting Information

Efficient Ce-Co Composite Oxides Decorated Au Nanoparticles for Catalytic Oxidation of CO in Simulated Atmosphere of CO_2 Laser

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Supporting figures and table

The equation for calculating the reaction rate was as follows:

$$x_{con} = \frac{X_{in} - X_{out}}{X_{in}} \times 100\% \qquad (1\text{-}1)$$

$$n_{co} = \frac{P \times V_{feed}}{RT} \times X_{in} \qquad (2\text{-}2)$$

$$TOF = \frac{n_{co} \times x_{con}}{m_{cat.} \times Au_{loading}} \qquad (2\text{-}3)$$

X_{in}: CO peak area tested by Gas Chromatography (GC)

X_{out}: The peak area of residual CO tested by GC

x_{con}: CO conversion

P: Atmospheric pressure

V_{feed} : The volume of gas which, under steady conditions, crosses the sample in unit time

T: Room temperature

n_{co}: The amount of CO in the feed gas

m_{cat} : The quality of catalyst

$Au_{loading}$: The actual loading of Au

TOF: Reaction rate

Table S1 Physical properties of various supported Au catalysts

Catalyst	Au nominal loading (wt %)	Au actual loading (wt %)	BET surface area (m^2 g^{-1})
Au/Al_2O_3	1.0	0.71	137
$Au/CeO_x/Al_2O_3$	1.0	0.79	126
$Au/CoO_x/Al_2O_3$	1.0	0.46	121
$Au/Ce\text{-}Co\text{-}O_x/Al_2O_3$	1.0	0.89	119

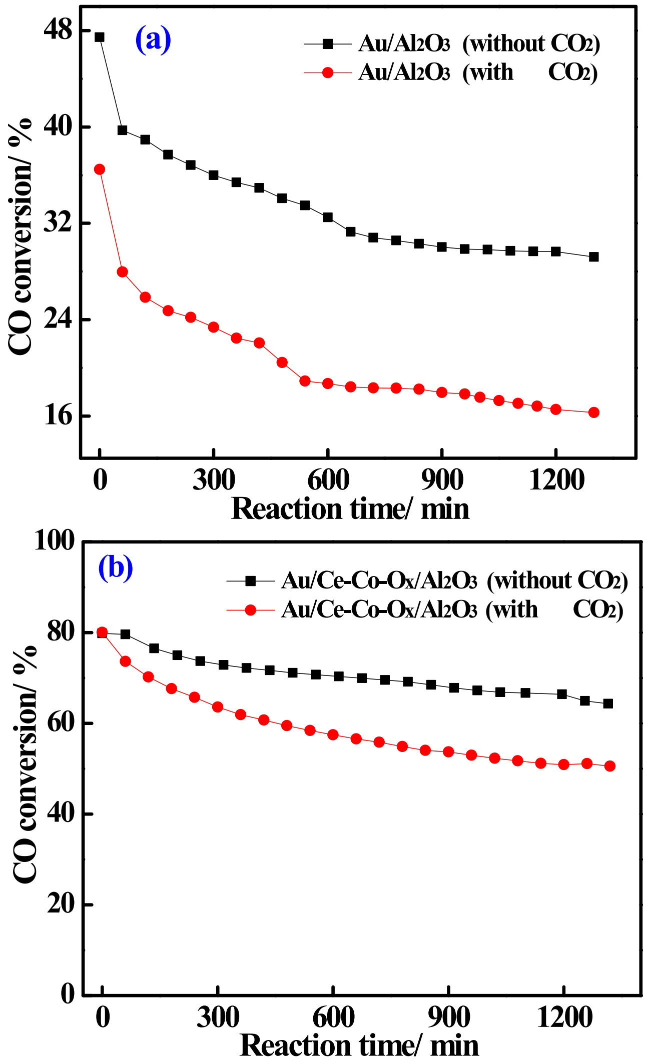

Fig. S1 CO conversions as a function of the reaction time over the Au/Al_2O_3 (a) and $Au/Ce\text{-}Co\text{-}O_x/Al_2O_3$ (b) catalysts in atmospheres with and without CO_2

Reactant conditions: 60 vol.% CO_2 + 1 vol.% CO + 0.5 vol.% O_2, balanced N_2 (with CO_2); or 1 vol.% CO + 0.5 vol.% O_2, balanced N_2 (without CO_2); WHSV = 120, 000 mL g^{-1} h^{-1}, Temperature = 220 ^{o}C.

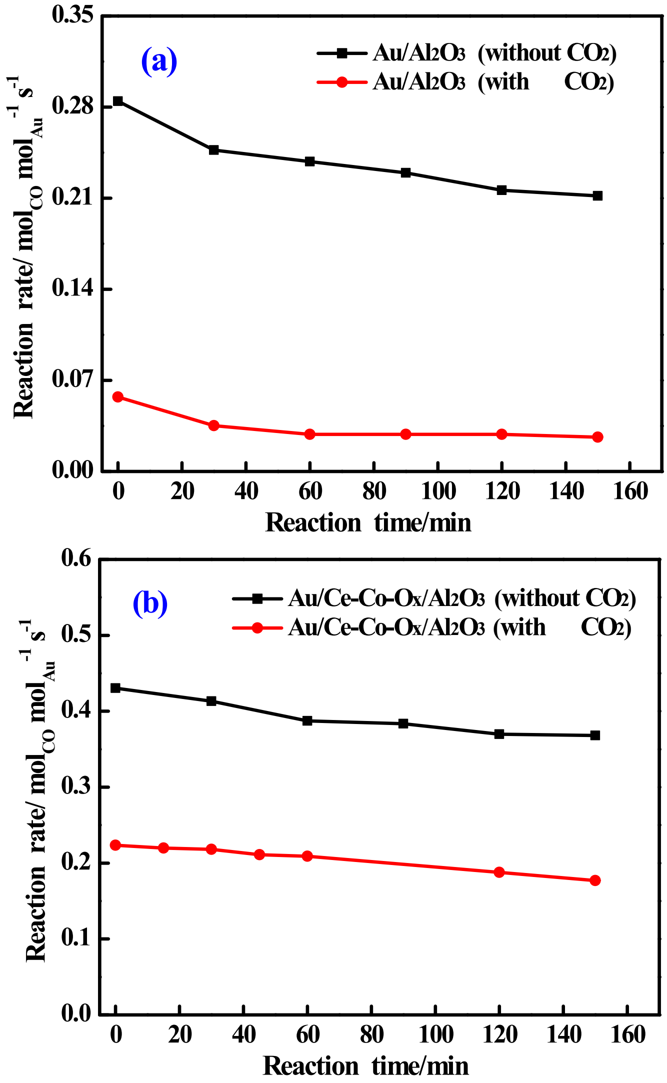

Fig. S2 CO oxidation specific rates as a function of the reaction time over the Au/Al_2O_3 (a) and $Au/Ce\text{-}Co\text{-}O_x/Al_2O_3$ (b) catalysts in atmospheres with and without CO_2

Reactant conditions: 60 vol.% CO_2 + 1 vol.% CO + 0.5 vol.% O_2, balanced N_2; or 1 vol.% CO + 0.5 vol.% O_2, balanced N_2 (without CO_2); WHSV = 1, 200, 000 mL g^{-1} h^{-1}, Temperature = 220 ^{o}C

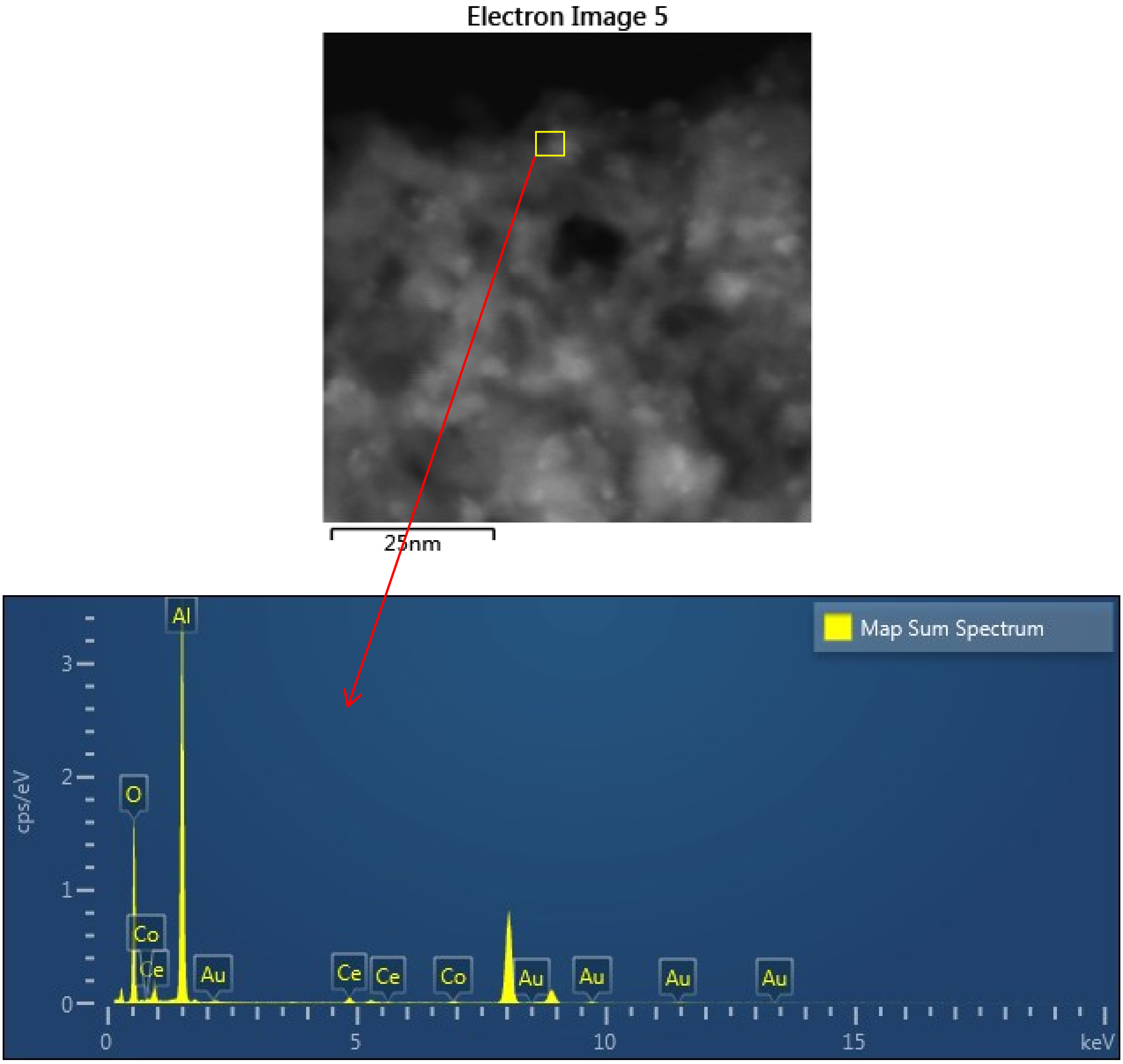

Fig. S3 HAADF-STEM image and EDX profiles of Au/Ce-Co-O_x/Al_2O_3 catalyst.