Supporting Information

Synergistic Effects of Bimetallic AuPd and La_2O_3 in the Catalytic Reduction of NO with CO

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1. X-ray photoelectron spectroscopy (XPS)

Table S1 summarises results of XPS analysis of catalysts pre-treated in hydrogen at 300 ^{o}C for 1h. The addition of La_2O_3 had no influence of the ratio of Au to Pd on the near-surface region detectable by XPS.

Table S1. XPS results of AuPd, AuPd-La, La supported on TiO_2. Catalyst designations are given in the Experimental Section of the main manuscript.

Catalyst	XPS			
	Binding energy of $Au4f_{7/2}$ (eV)	Binding energy of $Pd3d_{5/2}$ (eV)	Au / Au + Pd	La / Au + Pd + La
$AuPd/TiO_2$	82.8	334.1 – 334.6	0.43	0
$AuPd\text{-}La(1:0.5)/TiO_2$	82.7	334.1 – 334.6	0.43	0.48
$AuPd\text{-}La(1:1)/TiO_2$	82.6	334.1 – 334.6	0.42	0.65
$AuPd\text{-}La(1:2)/TiO_2$	82.6	334.1 – 334.6	0.44	0.67
La/TiO_2	–	–	–	–

2. X-ray diffraction (XRD)

Figure S1 shows XRD patterns of catalysts pre-treated in hydrogen for 1h. All the patterns are assigned to rutile and ananase phases of TiO_2. Patterns of bimettalic AuPd nanoparticles were not detected because the particle size was small (2.1-2.2 nm). Crystalline phase of La_2O_3 was not detected either, indicating that La_2O_3 is finely dispersed on the catalyst surface either as amorphous particles or mono-/multi-layers.

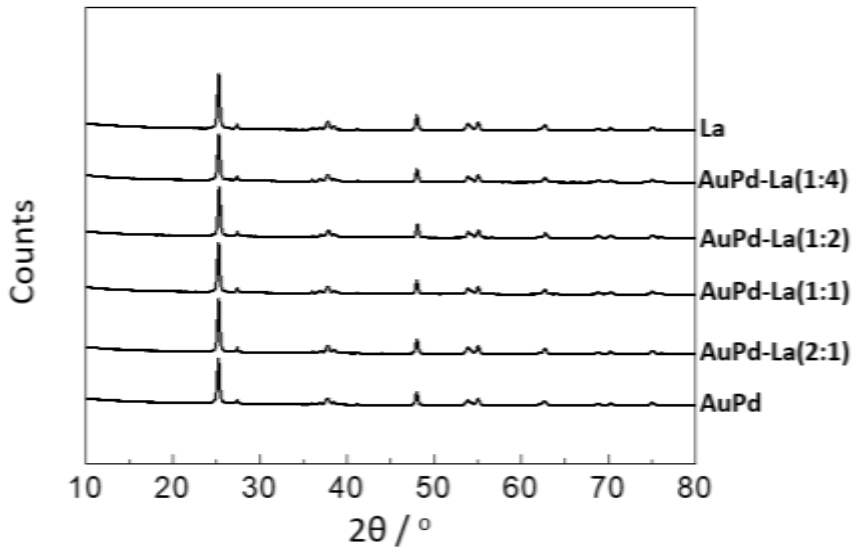

Figure S1. XRD patterns of catalysts.

3. In situ IR spectra during adsorption-desorption of NO

Figure S2 displays phase-domain IR spectra during NO adsorption-desorption cycles at 50 ^{o}C (2000 ppm NO in He balance, 150 mL/min). Because of the background change caused by reflectivity and absorptivity change of TiO_2 surface, some bands were difficult to be assigned. The IR band at ca. 1750 cm^{-1} is assigned to on-top NO on Pd surface. As clearly seen, there was no obvious difference in IR spectra by the addition of La_2O_3.

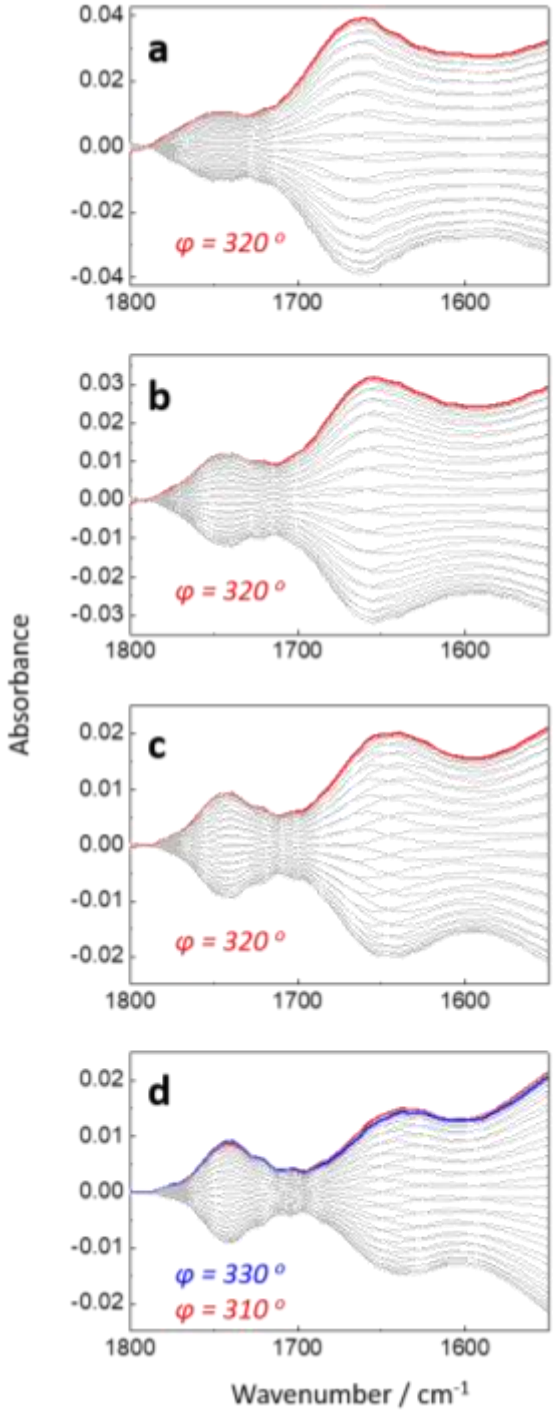

Figure S2. Phase-domain IR spectra during NO adsorption-desorption cycles at 50 ºC.