

Supplementary material

Aqueous phase reforming of ethylene glycol on Pt/CeO₂-ZrO₂: effects of cerium to zirconium molar ratio

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Supplementary **Table S1** represents the catalytic activity on the Pt/CeO₂-ZrO₂ catalysts with different amount of platinum from 0 to 9wt% on the CeO₂-ZrO₂(4) support.

Supplementary **Table S2** represents the crystallite sizes and peak positions of the most intensive peaks assigned to cubic-CeO₂ or tetragonal-ZrO₂ at $2\theta = 29^\circ$ from XRD analysis.

Supplementary **Figure S1** represents the catalytic activity of the Pt/CeO₂-ZrO₂ catalysts with time on stream (h), which contain different amounts of platinum form 0 to 9wt%.

Supplementary **Figure S2** represents the results of Raman shifts of the fresh Pt/CeO₂-ZrO₂ catalysts.

Supplementary **Figure S3** represents the XPS spectra of Ce3d_{5/2} on the fresh Pt/CeO₂-ZrO₂ catalysts.

Table S1. Catalytic activity on the Pt/CeO₂-ZrO₂ with different amounts of platinum

Notation ^a	EG conversion to gas (mol %)	H ₂ production rate (ml/g _{cat} /min)	Selectivity (mol %)			
			H ₂	CO	CO ₂	HCS ^b
Pt(3)/CeO ₂ -ZrO ₂ (4)	20.4	12.9	72.5	2.0	24.8	0.7
Pt(5)/CeO ₂ -ZrO ₂ (4)	43.3	30.0	74.3	0.0	25.0	0.7
Pt(9)/CeO ₂ -ZrO ₂ (4)	43.1	27.6	72.6	0.6	26.2	0.6

^aDifferent amounts of platinum were impregnated on CeO₂-ZrO₂(4) support, and 0 – 9wt%Pt loaded Pt/CeO₂-ZrO₂ catalysts were tested at the same reaction conditions of T = 250 °C and P = 4.5 MPa.

^bHCS represents the formed hydrocarbons, which are mainly C₁-C₃ linear paraffin species.

Table S2. The crystallite sizes and peak positions of the most intensive peaks assigned to cubic-CeO₂ or tetragonal-ZrO₂ at 2θ = 29° from XRD analysis

Notation	Crystallite size of CeO ₂ or ZrO ₂ (nm)		Diffraction peak positions (2θ) of tetragonal ZrO ₂		
	Before reaction	After reaction	Before reaction	After reaction	Shift (after – before)
Pt/ZrO ₂	14.4	26.6	30.18	30.26	0.08
Pt/CeO ₂ -ZrO ₂ (3)	8.1	9.0	29.83	29.91	0.08
Pt/CeO ₂ -ZrO ₂ (4)	6.2	6.7	29.36	29.39	0.03
Pt/CeO ₂ -ZrO ₂ (6)	6.3	6.7	28.94	29.02	0.08
Pt/CeO ₂	13.0	17.4	28.49	28.53	0.04

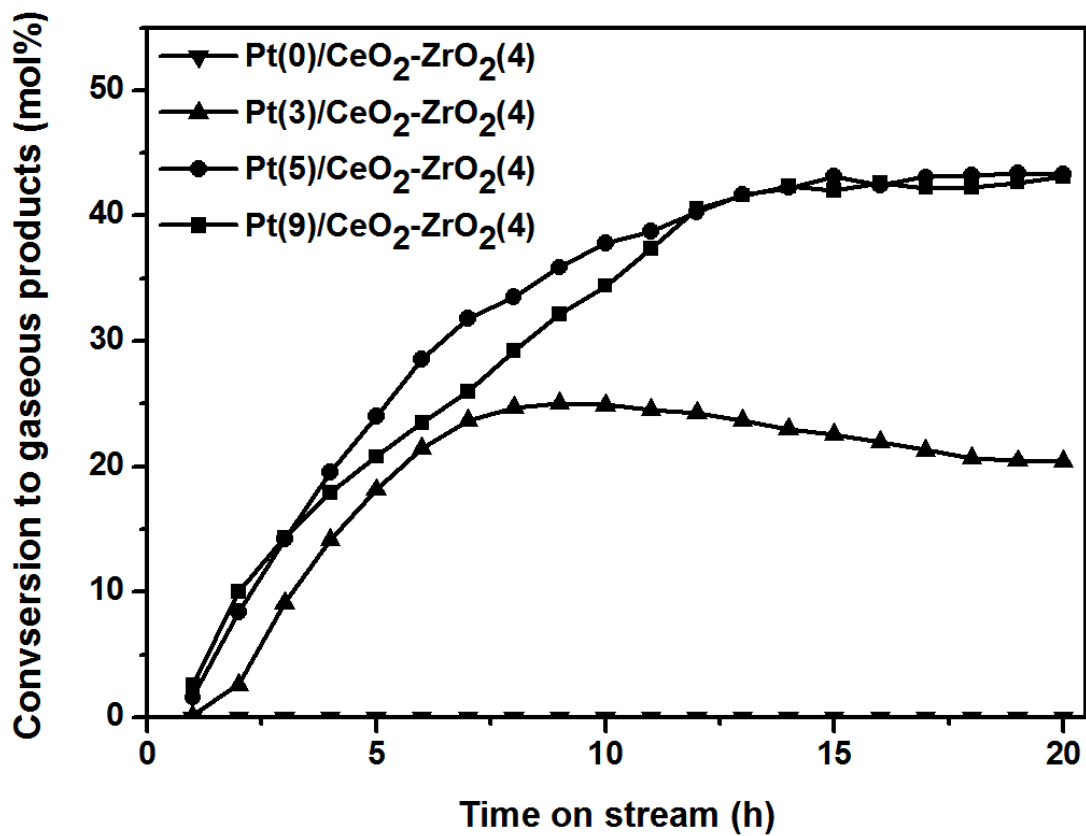


Figure S1. Catalytic activity of the Pt/CeO₂-ZrO₂ catalysts with time on stream (h), which contain different amounts of platinum from 0 to 9wt%

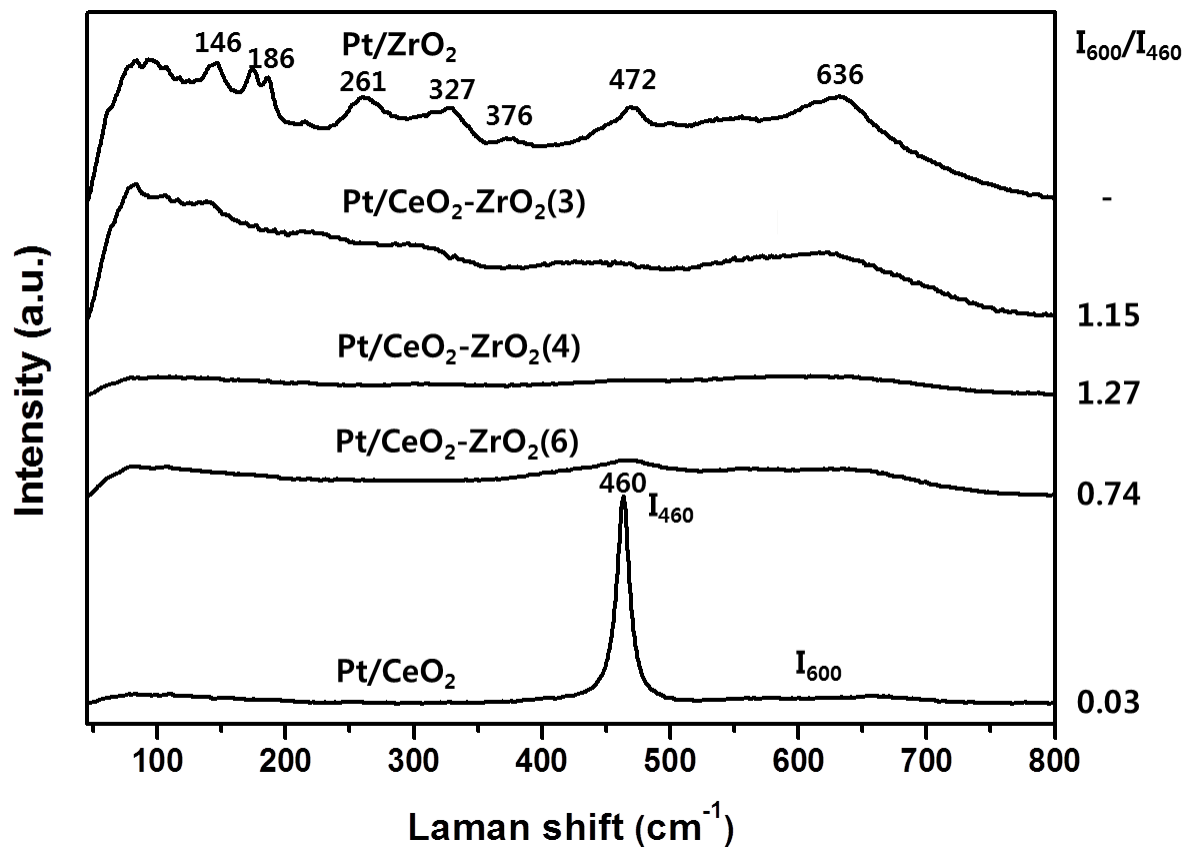


Figure S2. Results of Raman shifts of the fresh Pt/CeO₂-ZrO₂ catalysts

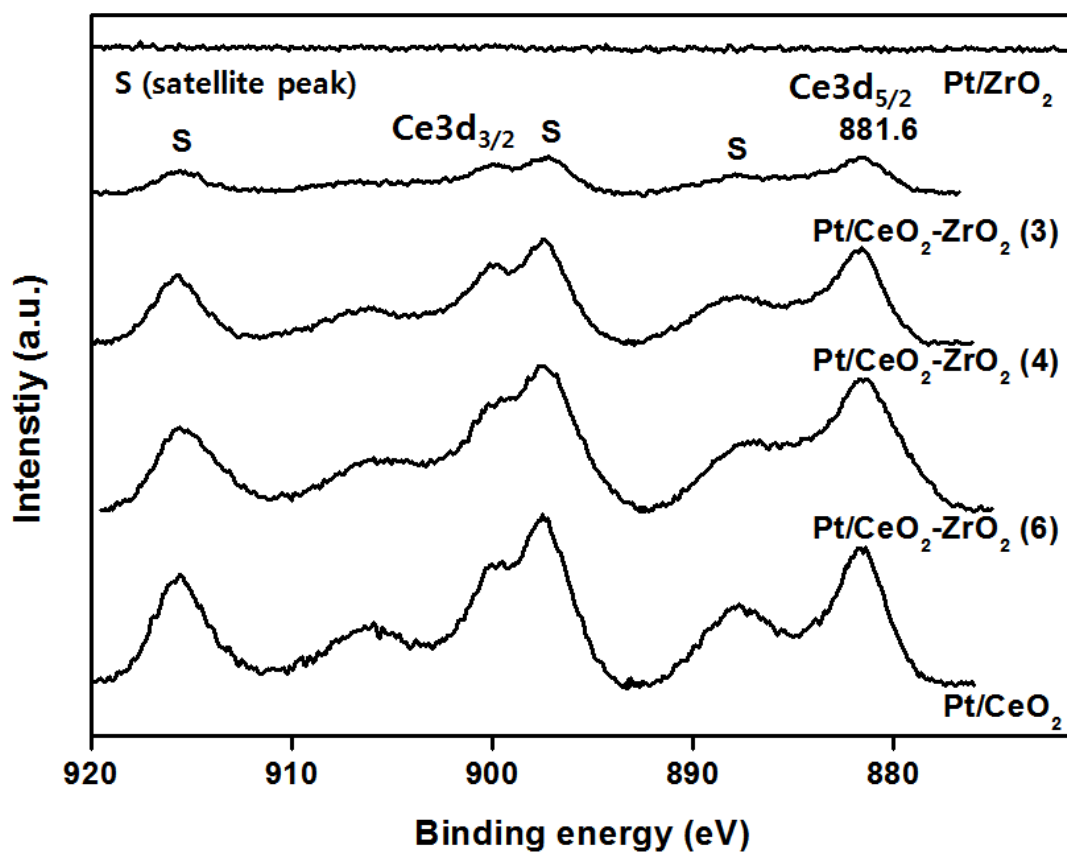


Figure S3. XPS spectra of Ce $3d_{5/2}$ on the fresh Pt/CeO₂-ZrO₂ catalysts