Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Supporting Information for

Rational design of ethanol steam reforming catalyst based on analysis of Ni / La_2O_3 metal-support interactions

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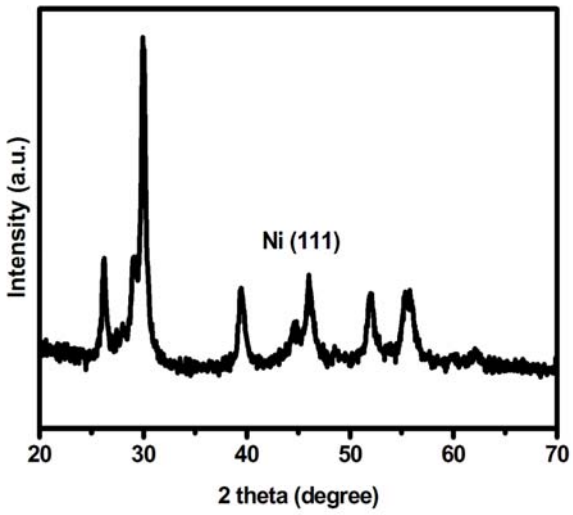

Figure S1 The XRD pattern of Ni/La_2O_3 catalyst.

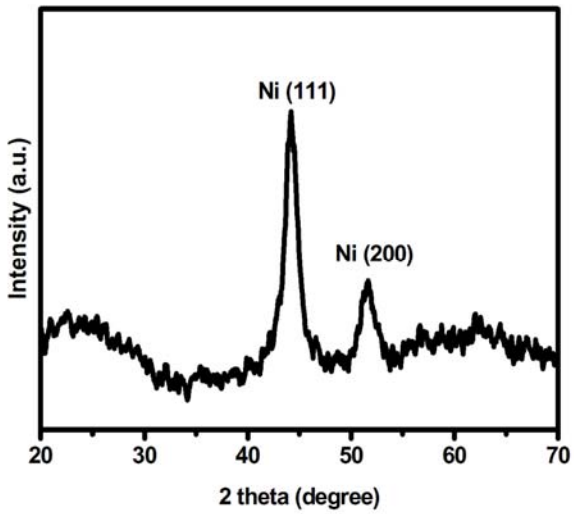

Figure S2 The XRD pattern of Ni/SiO_2 catalyst.

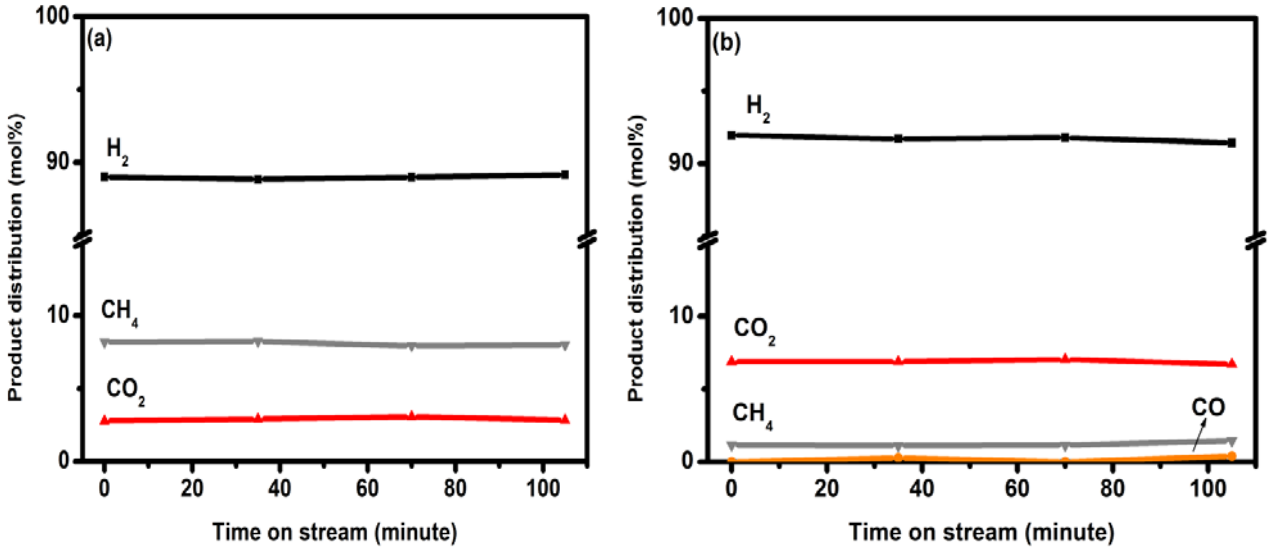

Figure S3 The reaction product distribution of : (a) Ni/SiO_2 and (b) Ni/La_2O_3 catalysts as a function of reaction time at 395℃. Each catalyst was exposed to a well mixture of CO (29.5 torr), H_2 (295 torr) ,and H_2O (334 torr).

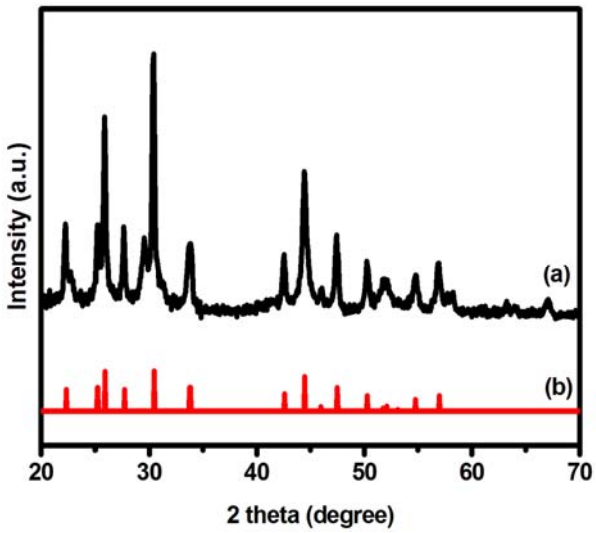

Figure S4 XRD patterns of (a) Ni/La_2O_3 used catalyst and (b) $La_2O_2CO_3$ JCPDS reference.

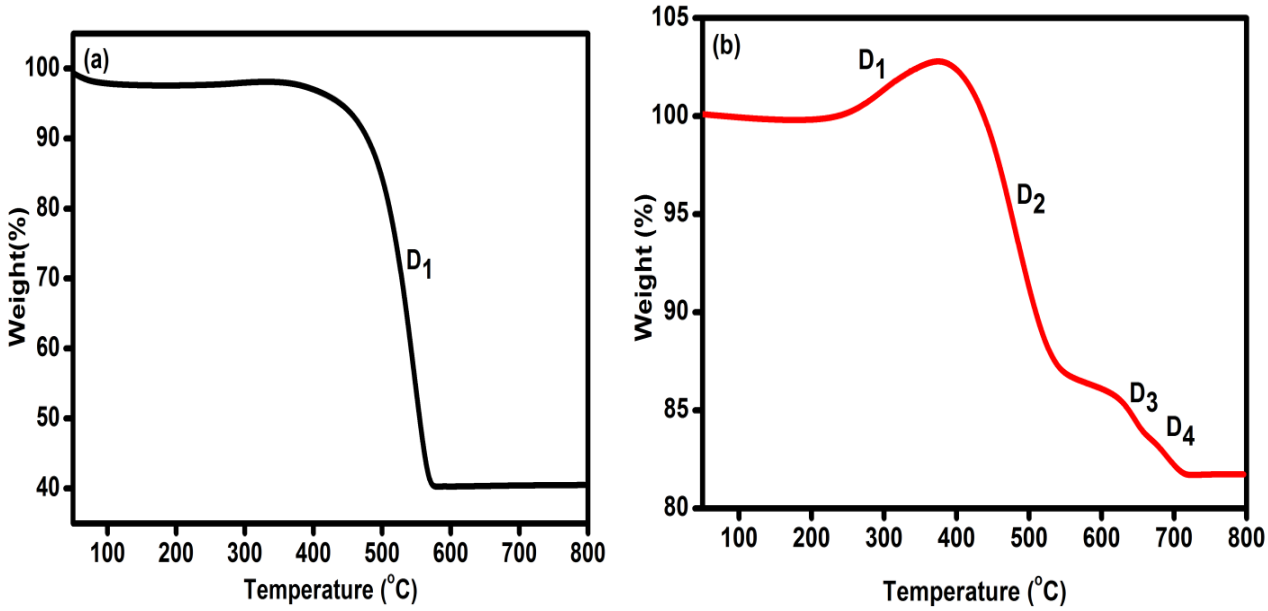

Figure S5 TGA of (a) Ni/SiO_2, and (b) Ni/La_2O_3 used catalysts.

Table S1 the H_2 uptake and grain size of various catalysts

Catalyst	H_2 uptake[1]	Grain size[2]
	μ mole/g	(nm)
	30℃	
Ni/SiO_2	552.8	6.3
Ni/La_2O_3	54.4.	6.6

[1]: Calculated based on the H_2 pulse experiment.

[2]: Calculated based on the XRD results

Table S2 Carbon balance for the Ni/La_2O_3 catalyst with various reaction temperatures

Temp (℃)	300	325	360	395	435	465	500
Input C balance (10^{-7} mol)	2.49	2.49	2.49	2.49	2.49	2.49	2.49
Output C balance (10^{-7} mol)	2.49	2.49	2.41	2.45	2.30	2.25	2.36

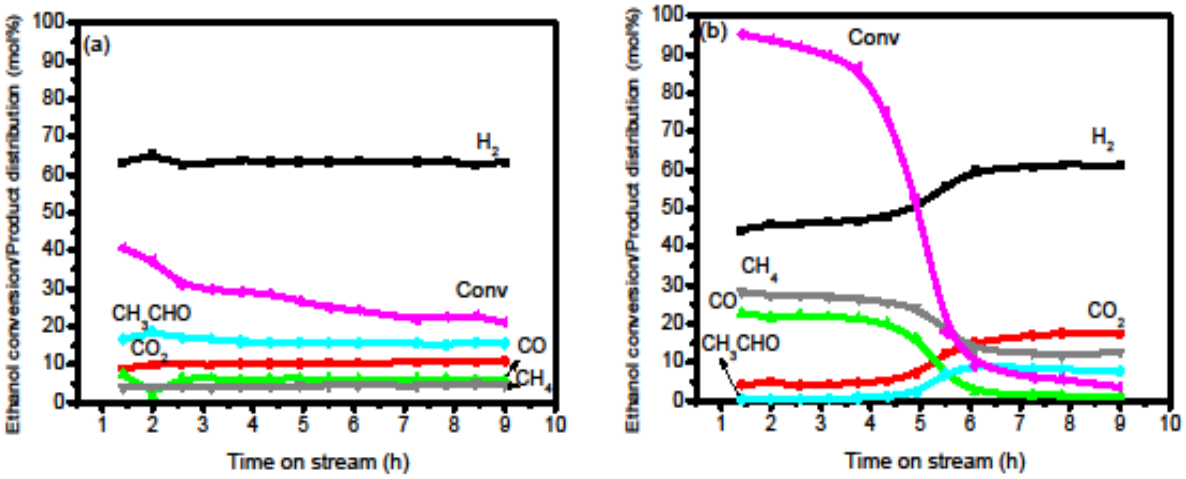

Figure S6 ESR reaction of (a) Ni/La_2O_3 and (b) Ni/SiO_2 catalysts with time on stream (h). Reaction temperature: 395℃. Condition: WHSV = 44.8 h^{-1} and $H_2O/EtOH = 4$