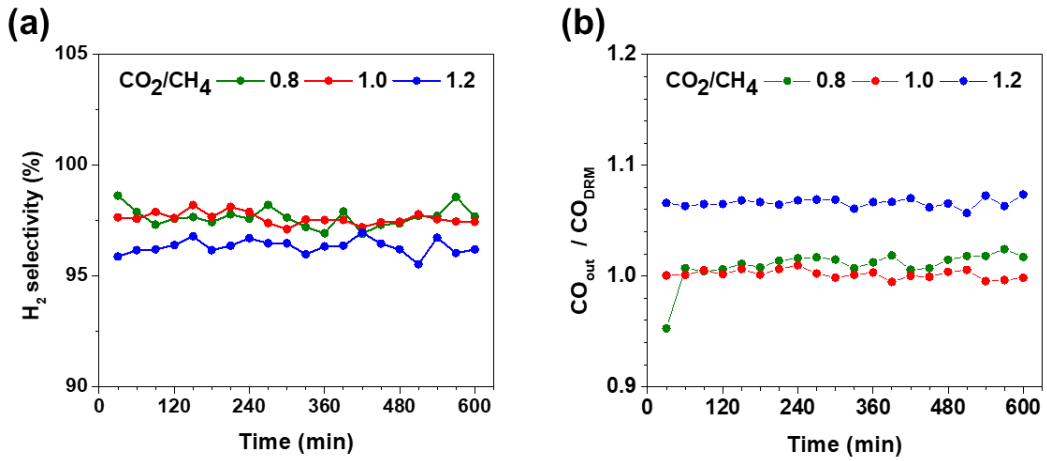

Figure S1. Time on stream results of dry reforming reaction with Ni/Al_2O_3 catalyst: (a) H_2 selectivity, (b) CO_{out}/CO_{DRM} ratio ; T = 850 °C, WHSV = 60 L/g·h^{-1}.

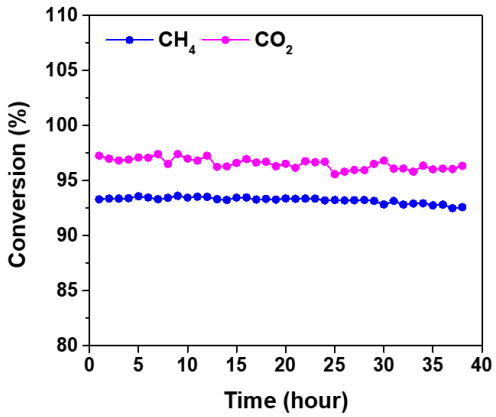

Figure S2. Time on stream results of dry reforming reaction over Ni/Al_2O_3 catalyst; T = 850 ℃, WHSV = 60 L/g·h^{-1}, CH_4:CO_2:N_2 = 3:3:4.

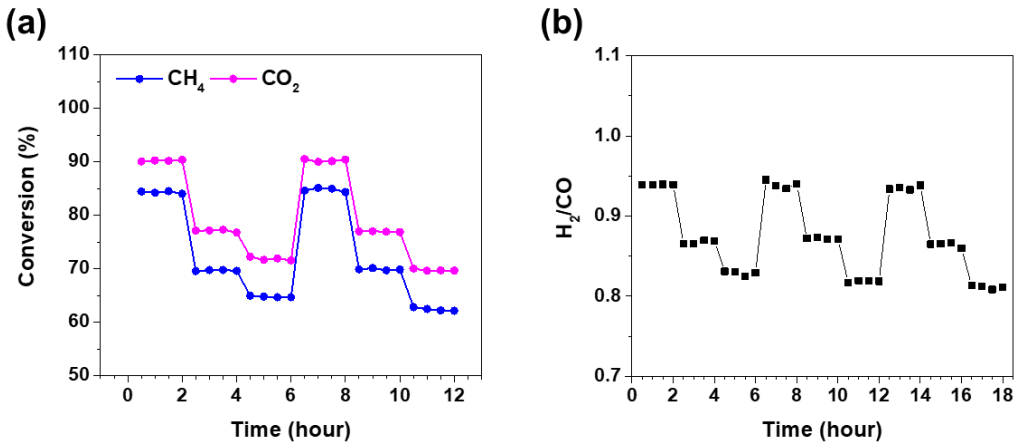

Figure S3. Time on stream results of dry reforming reaction over Ni/Al_2O_3 catalyst with different WHSV of 60, 120, 180 $L/g \cdot h^{-1}$: (a) Conversion of CH_4 and CO_2, (b) H_2/CO ratio; T = 800 ℃, $CH_4:CO_2:N_2$ = 3:3:4.

Table S1. Comparative research on dry reforming of methane over Ni/Al_2O_3 catalyst.

Catalyst	Reaction temperature	Space velocity (GHSV)	Feed composition	CH_4 conversion	H_2/CO	Stability test	Ref.
10 wt% Ni/Al_2O_3 (WI)	850 ℃	60 $L \cdot g^{-1}h^{-1}$	$CH_4:CO_2:N_2$ = 3:3:4 (Total= 50mL/min)	93%	0.97	38 h	In this research
10.5 wt% Ni/Al_2O_3 (WI)	800 ℃	60 $L \cdot g^{-1}h^{-1}$	$CH_4:CO_2:N_2$ = 7.5:7.5:5 (Total= 20mL/min)	85%	0.88	66 h	[44]
10 wt% Ni/Al_2O_3 (WI)	700 ℃	24 $L \cdot g^{-1}h^{-1}$	$CH_4:CO_2:N_2$ = 1:1:3 (Total= 12mL/min)	~82%	-	200 h	[29]
5 wt% Ni/Al_2O_3 (WI)	700 ℃	120 $L \cdot g^{-1}h^{-1}$	$CH_4:CO_2:N_2$ = 1:1:2 (Total= 60mL/min)	~76%	0.85	20 h	[19]