

Performance and Stability of Doped Ceria–Zirconia Catalyst for a Multifuel Reforming

List of supplementary figures and Tables

Table S1: Experimental conditions adopted for ATR, SR and ATR reactions over undoped NiCZ80 and doped NidpCZ80 catalysts.

Figure S1: XRD spectra of NiCZ80 spent catalyst after methane SR, POX and ATR reactions.

Figure S2: Conversion of propane in ATR, SR and POX conditions at $T=800^{\circ}\text{C}$ GSVH=12000 h⁻¹ over undoped and doped catalysts, with and without 100 ppm H₂S.

Figure S3: X-Ray patterns of NidCZ80 fresh and after ATR reactions of methane and propane with 100 ppm of H₂S at $T=800^{\circ}\text{C}$ and GSVH=120000 h⁻¹.

Figure S4: TEM image of doped catalysts after ATR of methane at $T=800^{\circ}\text{C}$ and GSHV=120000 h⁻¹.

Figure S5: TEM image of undoped catalysts after ATR of propane at $T=800^{\circ}\text{C}$ and GSHV=120000 h⁻¹.

Figure S6: Reactors after endurance tests of undoped NiCZ80 and doped NidpCz80. The presence of coke is evident for the undoped NiCZ80 catalyst.

Table S1. Experimental conditions adopted for ATR, SR and ATR reactions over undoped NiCZ80 and doped NidpCZ80 catalysts.

Reaction	Catalyst	Fuel	Experimental conditions					
Type	3%NiCZ80	CH ₄	S/C	O/C	GHSV [h ⁻¹]	T		
ATR			2.5	0.5	120,000	800°C		
SR			2.5	--				
POX			--	0.5				
ATR /100ppm H ₂ S	2.5		0.5					
ATR	3%NidpCZ80		2.5	0.5				
SR			2.5	--				
POX			--	0.5				
ATR /100ppm H ₂ S			2.5	0.5				
ATR	3%NiCZ80	C ₃ H ₈	2.5	0.5				
SR			2.5	--				
POX			--	0.5				
ATR / 100ppm H ₂ S			2.5	0.5				
ATR			3%NidpCZ80				2.5	0.5
SR							2.5	--
POX							--	0.5
ATR / 100ppm H ₂ S							2.5	0.5
ATR	3%NiCZ80	CH ₄ /CO ₂	2.5	0.5				
ATR/ 100ppm H ₂ S			2.5	0.5				
ATR	3%NidpCZ80	CH ₄ /CO ₂	2.5	0.5				
ATR/ 100ppm H ₂ S			2.5	0.5				

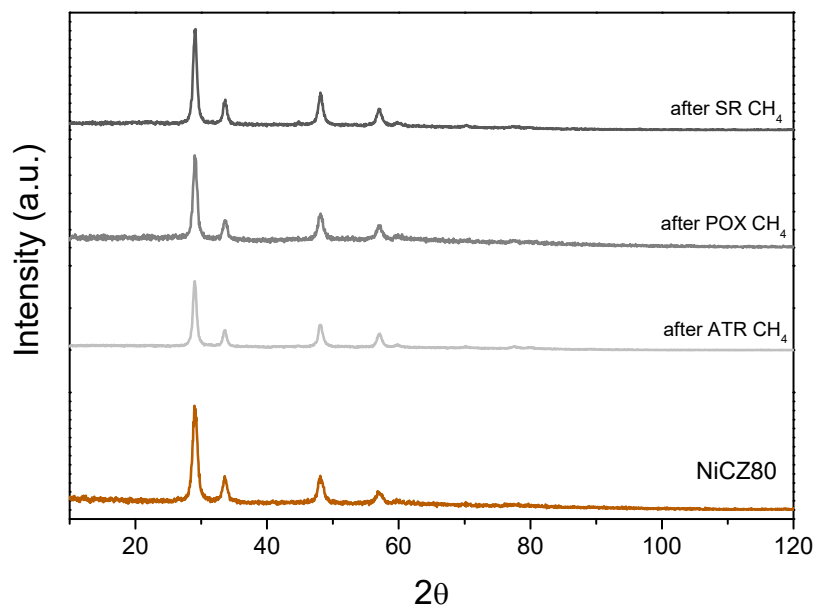


Figure S1. XRD spectra of NiCZ80 spent catalyst after methane SR, POX and ATR reactions.

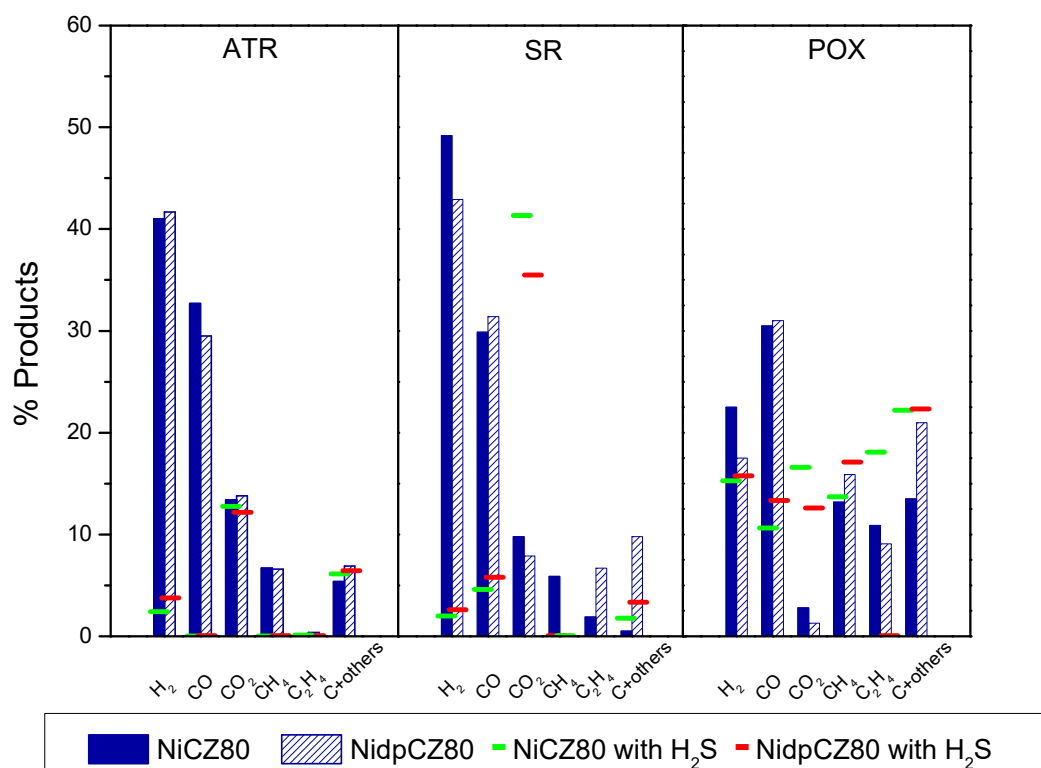


Figure S2. Conversion of propane in ATR, SR and POX conditions at T=800°C GSVH=12000 h-1 over undoped and doped catalysts, with and without 100 ppm H₂S.

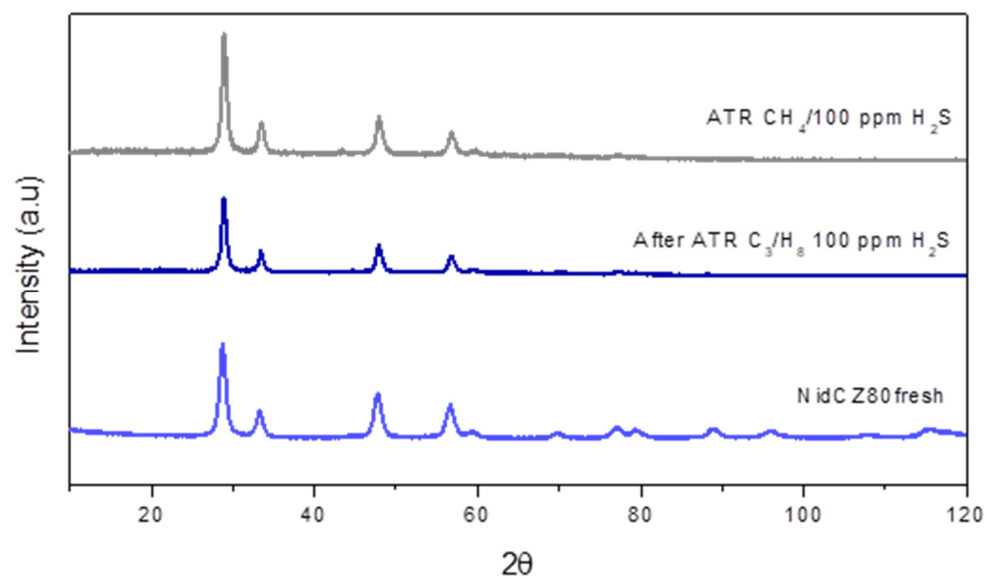


Figure S3. X-Ray patterns of NidCZ80 fresh and after ATR reactions of methane and propane with 100 ppm of H₂S at T=800°C and GSVH=120000 h⁻¹.

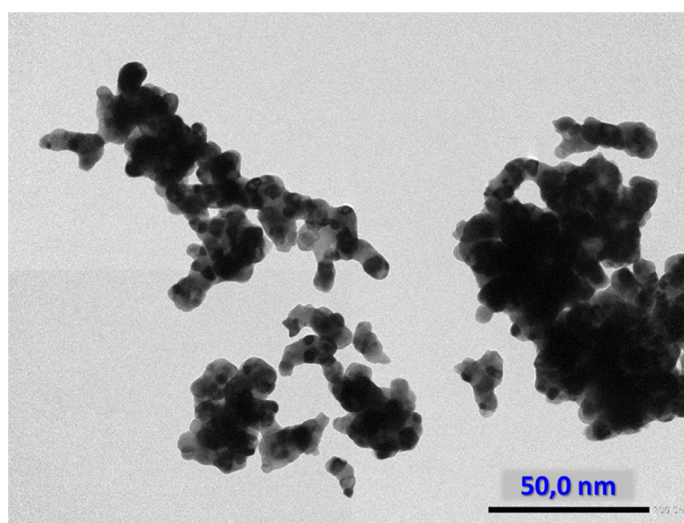


Figure S4. TEM image of doped catalysts after ATR of methane at T=800°C and GSHV=120000 h⁻¹.

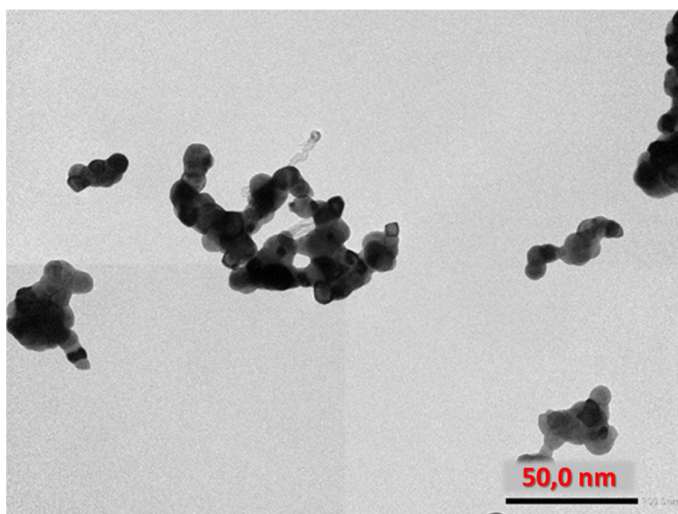


Figure S5. TEM image of undoped catalysts after ATR of propane at $T=800^{\circ}\text{C}$ and $\text{GSHV}=120000\text{ h}^{-1}$.



Figure S6. Reactors after endurance tests of undoped NiCZ80 and doped NidpCZ80. The presence of coke is evident for the undoped NiCZ80 catalyst.