

Synthesis and characterization of Rh/MnO₂-CeO₂/Al₂O₃ catalysts for CO-PrOx reaction

Tables

Table 1. CeO₂ crystallite size, lattice parameter and Ov/F2g area ratio

Code	^a Crystalline domain size of CeO ₂ (nm)	^b Lattice parameter(Å)	^c Ov/F2g area ratio
CeO ₂	-	5.414	-
RhCe ₅₀ Al	7.7	5.401	
RhCe ₄₀ Mn ₁₀ Al	5.7	5.381	0.26
RhCe ₂₀ Mn ₃₀ Al	5.5	5.362	0.36

^a Calculated from XRD data, with Scherrer's equation and (111) crystallographic plane

^b Calculated from XRD data, with Bragg's equation for a cubic cell

^c Calculated from Raman spectra (zoom Fig. 3).

Table 2. Textural properties for the synthesized materials

Code	SBET (m ² g ⁻¹)	Pore volume (cm ³ g ⁻¹)	Pore size (nm)
RhCe ₅₀ Al	90	0.21	8.5
RhCe ₄₀ Mn ₁₀ Al	87	0.14	7.2
RhCe ₂₀ Mn ₃₀ Al	45	0.10	5.8
RhCe ₁₀ Mn ₄₀ Al	46	0.10	5.9
RhMn ₅₀ Al	41	0.08	5.1

Table 3. H₂-TPR results: Experimental hydrogen consumption and Reducibility percentage (RP) of the samples

Code	H ₂ consumption (mm/g)	RP (%)
RhCe ₅₀ Al	5.046	85.1
RhCe ₄₀ Mn ₁₀ Al	5.095	86.1
RhCe ₂₀ Mn ₃₀ Al	5.883	99.9

RhCe₁₀Mn₄₀Al	5.542	94.3
RhMn₅₀Al	5.319	90.7

Table 4. Temperature (in °C) and weight loss (in parenthesis, %) of the different processes from TGA-DTG experiments

Code	Physisorbed Water	Structural Water	MnO ₂ → Mn ₂ O ₃	Mn ₂ O ₃ → Mn ₃ O ₄
RhCe₅₀Al	61 (1.30%)	--	-	-
RhCe₄₀Mn₁₀Al	61 (1.68%)	--	561 (0.55%)	--
RhCe₂₀Mn₃₀Al	61 (1.52%)	181 (3.35%)	659 (4.89%)	994 (3.06%)
RhCe₁₀Mn₄₀Al	61 (1.79%)	134 (3.19%) 206 (1.31%)	665 (5.82%)	974 (4.22%)
RhMn₅₀Al	61 (2.88%)	130 (5.21%) 277 (4.28%) 300 (2.00%)	688 (4.85%)	990 (1.86%)