Supplementary information



Figure S1: HAADF-STEM image of a CeO_2 crystal (approximately oriented along [112]) supported on the alumina. The inset represents the Fourier transform with some indices of the cubic structure assigned to the corresponding spots.

Table S1: Structural parameters obtained from fitting of the k²-weighted EXAFS function of Rh/xSm_2O_3 - $yCeO_2$ -Al₂O₃ catalysts after reduction at 773 K for 2 h.

Catalyst	EXAFS analysis				
	Shell	CN ^a	R(Å) ^a	$\Delta\sigma^{2} \cdot 10^{-2} (\text{\AA}^2)^a$	E ₀ (eV) ^a
Rh/Al ₂ O ₃ _Cl	Rh-O	0.4 (0.02)	2.12 (0.009)	0.12 (0.16)	-5.3 (0.6)
	Rh-Rh	4.3 (0.08)	2.63 (0.002)	1.16 (0.03)	11.2 (0.2)
Rh/12CeO ₂ -Al ₂ O ₃ _Cl	Rh-O	0.7 (0.02)	2.14 (0.006)	0.64 (0.12)	-10.1 (0.3)
	Rh-Rh	3.8 (0.05)	2.68 (0.001)	0.46 (0.02)	10.1 (0.1)
Rh/Al ₂ O ₃ OAc	Rh-O	0.6 (0.03)	2.17 (0.006)	0.00 (0.11)	-6.1(0.4)
	Rh-Rh	3.6 (0.09)	2.63 (0.002)	0.90 (0.04)	14.1 (0.2)
Rh/12CeO ₂ -Al ₂ O ₃ OAc	Rh-O	0.5 (0.04)	2.17 (0.01)	0.92 (0.25)	-8.4 (0.5)
	Rh-Rh	3.1 (0.09)	2.66 (0.003)	0.84 (0.04)	13.6 (0.2)
Rh/6Sm ₂ O ₃ -6CeO ₂ -Al ₂ O ₃ _OAc	Rh-O	0.5 (0.03)	2.12 (0.009)	0.06 (0.19)	-8.4 (0.5)
	Rh-Rh	2.6 (0.09)	2.65 (0.003)	1.04 (0.05)	12.2 (0.2)

^a Coordination number, interatomic distance, Debye–Waller factor and shift in the energy threshold.

Table S2: Amount of rhodium atoms atomically dispersed (%) in the Rh/xSm_2O_3 - $yCeO_2$ -Al₂O₃ catalysts after reduction at 773 K for 2 h estimated from the STEM micrographs by counting the number of rhodium atoms atomically dispersed and in nanoparticles [30] in an equally large area.

Sample	Amount of rhodium atoms atomically dispersed (%)	
Rh/Al ₂ O ₃ _Cl	0	
Rh/12CeO ₂ -Al ₂ O ₃ _Cl	34	
Rh/Al ₂ O ₃ OAc	7	
Rh/12CeO ₂ -Al ₂ O ₃ OAc	33	
Rh/6Sm ₂ O ₃ -6CeO ₂ -Al ₂ O ₃ _OAc	52	