nanomaterials

MDPI

Supplementary material for

Optimization of the Load of Transition Metal Oxides (Fe_2O_3, Co_3O_4, NiO and/or PdO) onto CeO_2 Nanoparticles in Catalytic Steam Decomposition of *n*-C_7 Asphaltenes at Low Temperatures

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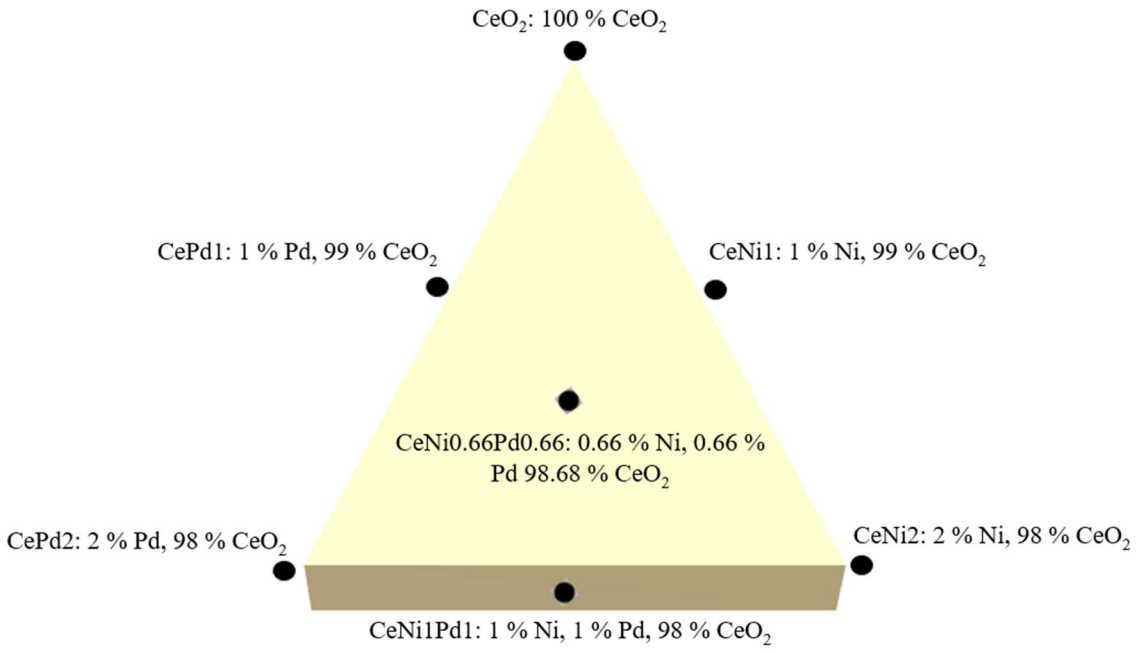

Figure S1. Three components simplex-centroid mixture design with a ceria support (CeO_2) functionalized with nickel oxide (NiO) and palladium oxide (PdO).

Table S1. Calculated parameters of the Special Cubic Model for the n-C_7 asphaltenes conversion time in the presence of SCMD nanoparticles.

β_1	β_2	β_3	β_{12}	β_{13}	β_{23}	β_{123}	R^2
0.006896	0.008264	0.008928	0.000246	0.002873	0.006017	0.003310	0.99

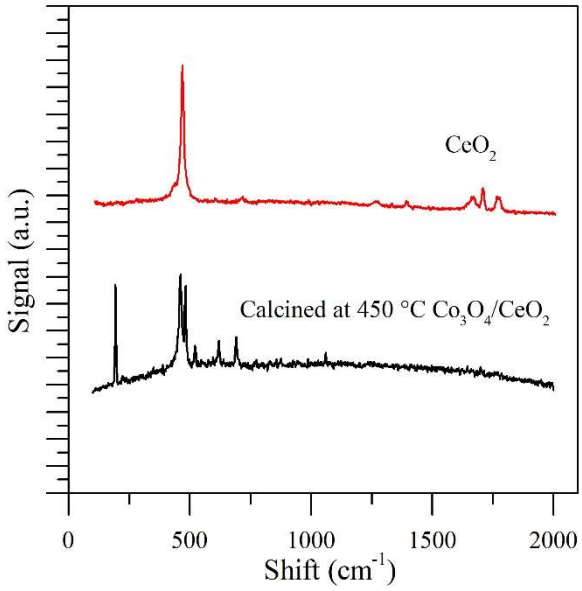

Figure S2. Raman spectra for the support (CeO_2) and for the NiPd/CeO_2 nanoparticles. For CeO_2 a characteristic spectrum for fluorite was obtained, and for the NiPd functionalizated CeO_2, a mixed of fluorite and spinel was obtained, confirming the presence of the Co_3O_4.