Pd supported on Pr-rich cerium-zirconium-praseodymium mixed oxides for propane and CO oxidation

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Supplementary information

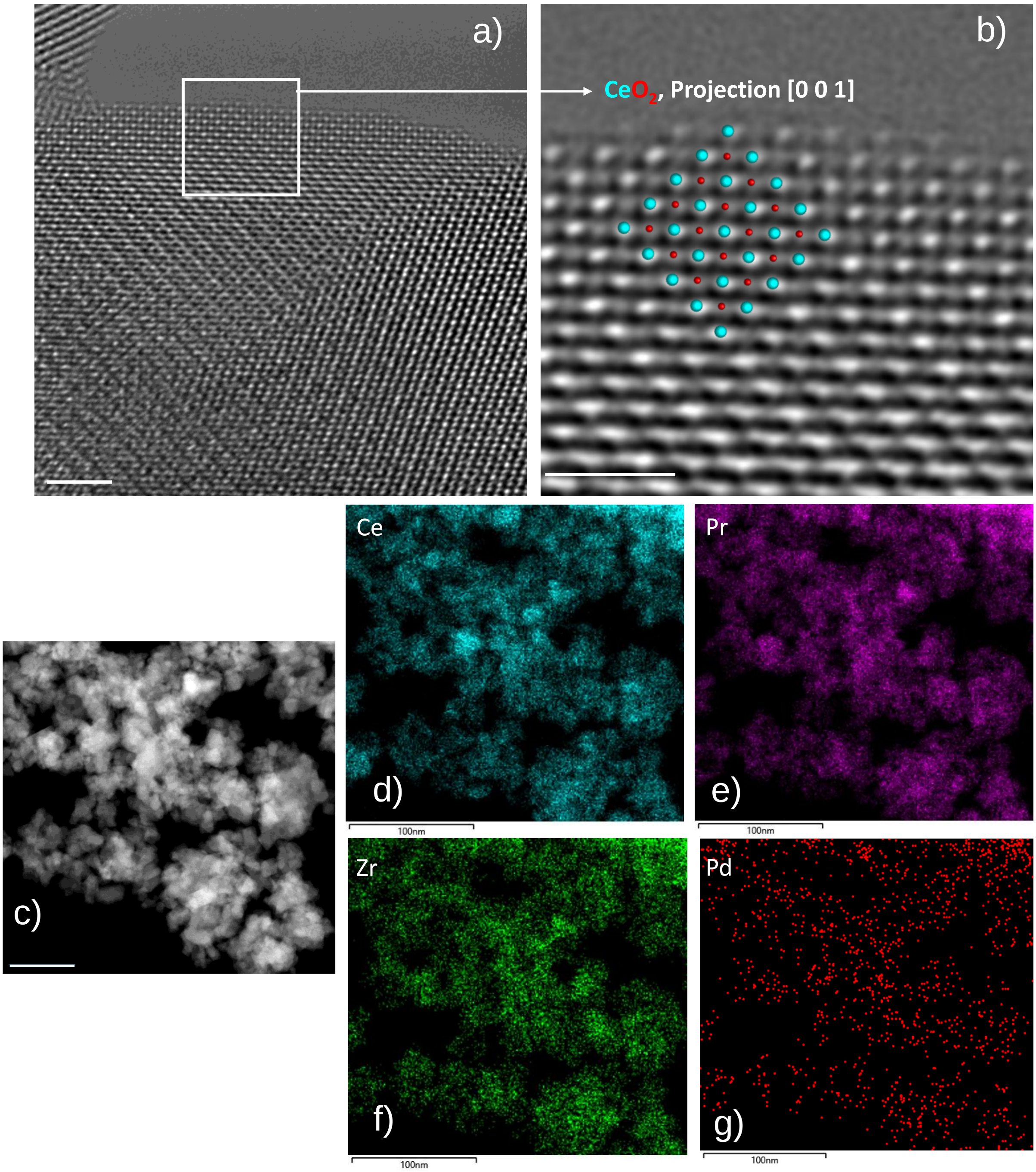

Figure S1. a) and c) representative HAADF-STEM images of Pd-HS, b) zoom in the with square of a) showing atomic columns of Ce and O characteristic of a plan (001) of a CeO_2 fluorite structure, d) e) f) and g) EDX mappings of Ce, Pr, Zr and Pd, respectively.

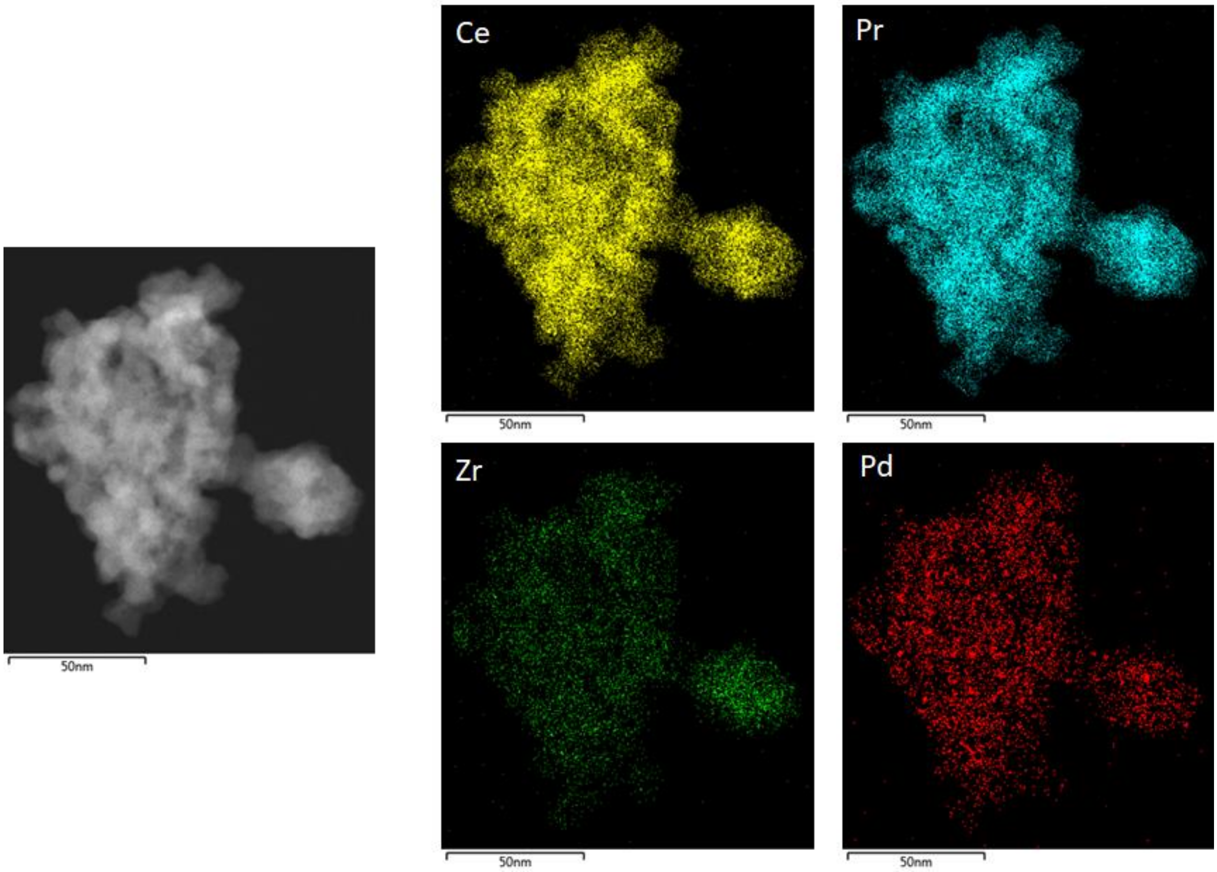

Figure S2. TEM image of Pd-HS after reduction in H_2 (500 °C, 1 h, 100 vol% H_2) and EDX mapping of Ce, Pr, Zr and Pd.

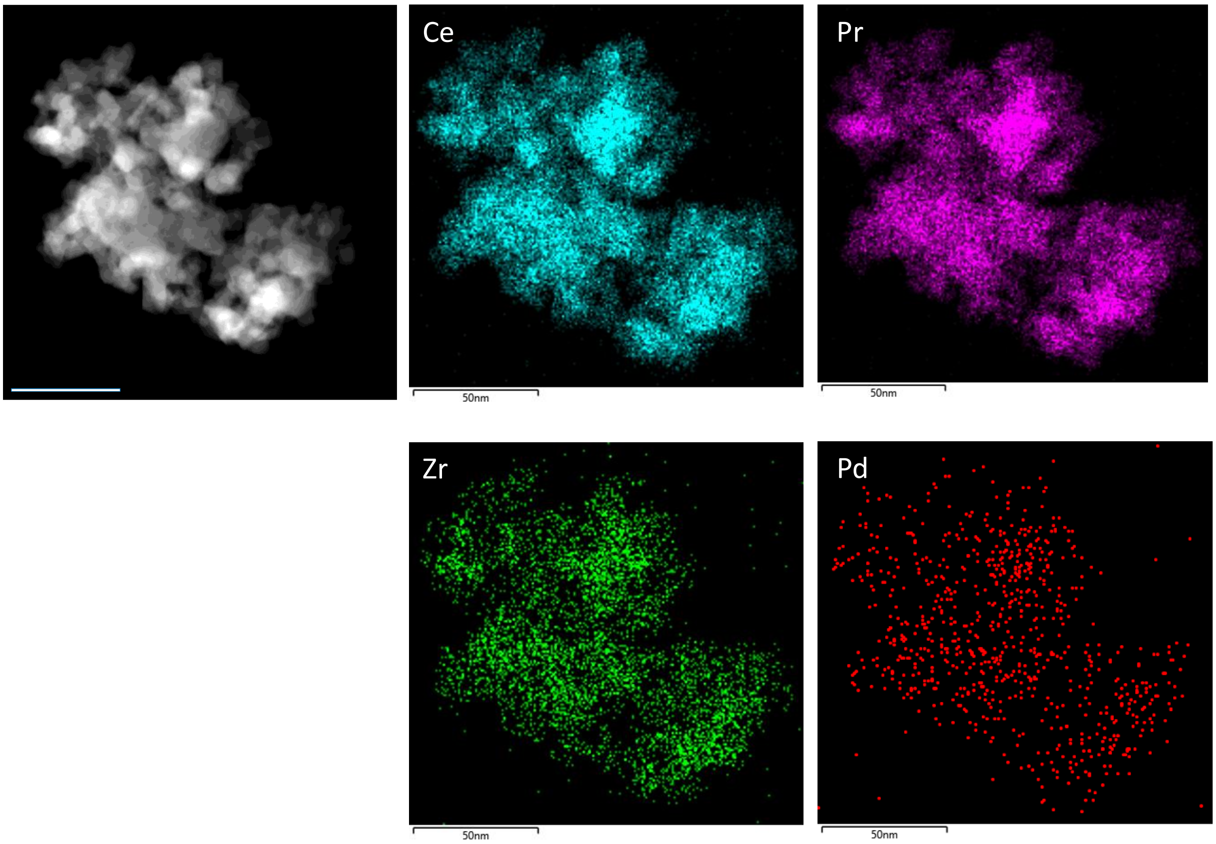

Figure S3. TEM image of Pd-HS after reduction in CO (500 °C, 1 h, 1 vol% CO) and EDX mapping of Ce, Pr, Zr and Pd.

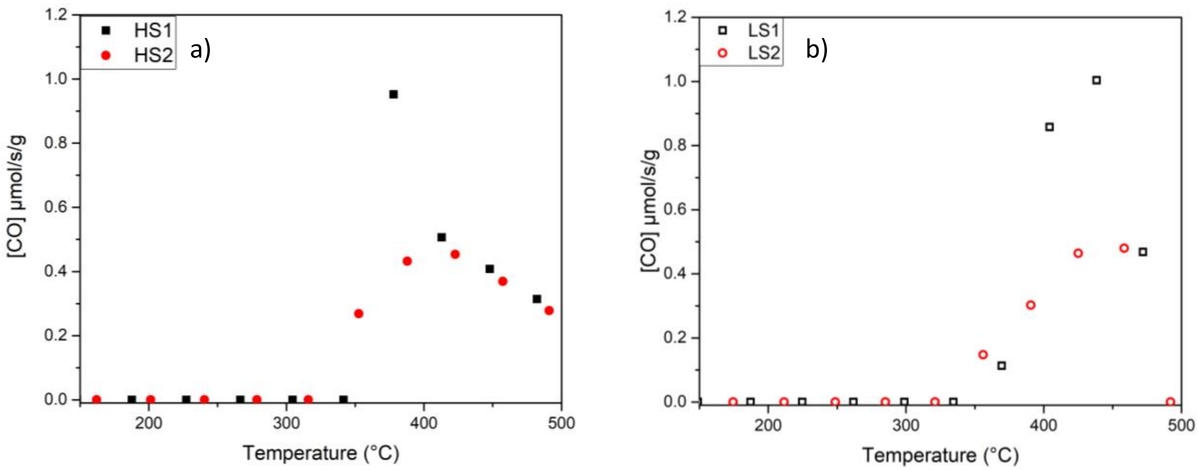

Figure S4. Variation of the CO production as a function of the temperature for a) Pd-HS and b) Pd-LS during C_3H_8-TPD experiments.

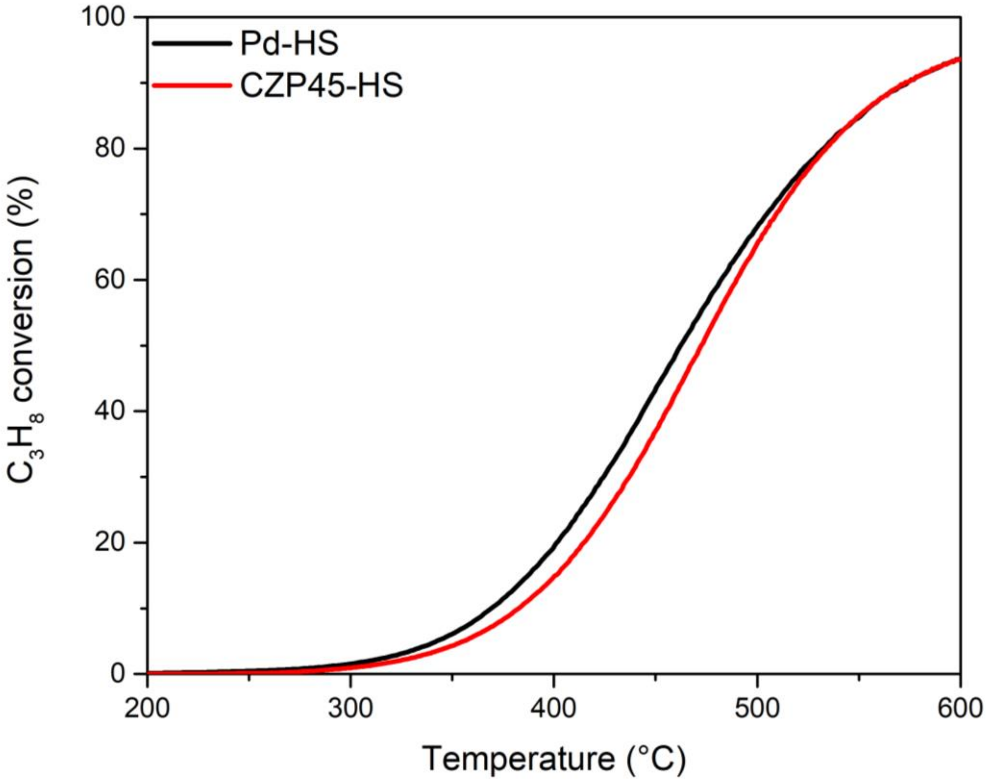

Figure S5. Variation of the propane conversion as a function of the temperature for Pd-HS (catalyst mass = 100 mg) and CZP45-HS (catalyst mass = 90 mg). Reactive mixture: C_3H_8/O_2: 2000 ppm / 9 vol%.

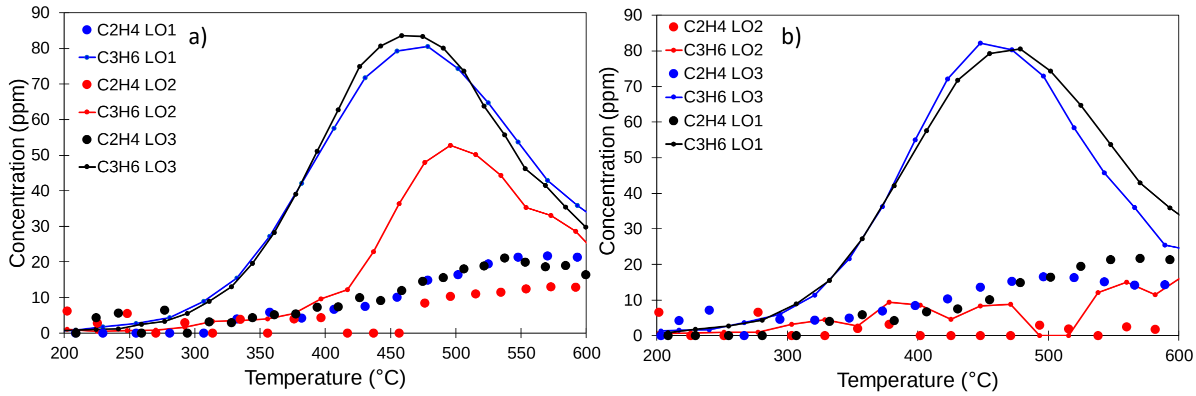

Figure S6. Secondary products analyzed during propane oxidation experiments on Pd-HS: a) LO2 after an H_2 reduction and b) LO2 after a CO reduction.

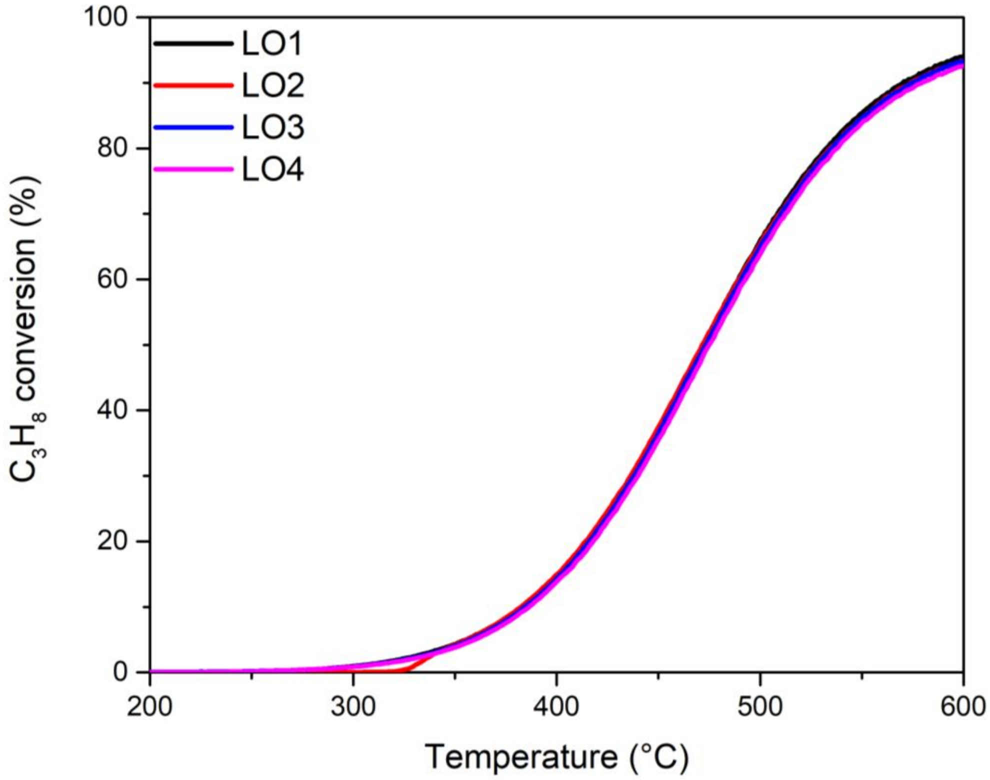

Figure S7. Variation of the propane conversion as a function of the temperature for CZP45-HS (reduction step in H_2.) Reactive mixture: C_3H_8/O_2: 2000 ppm / 9 vol%. Catalyst mass = 90 mg.

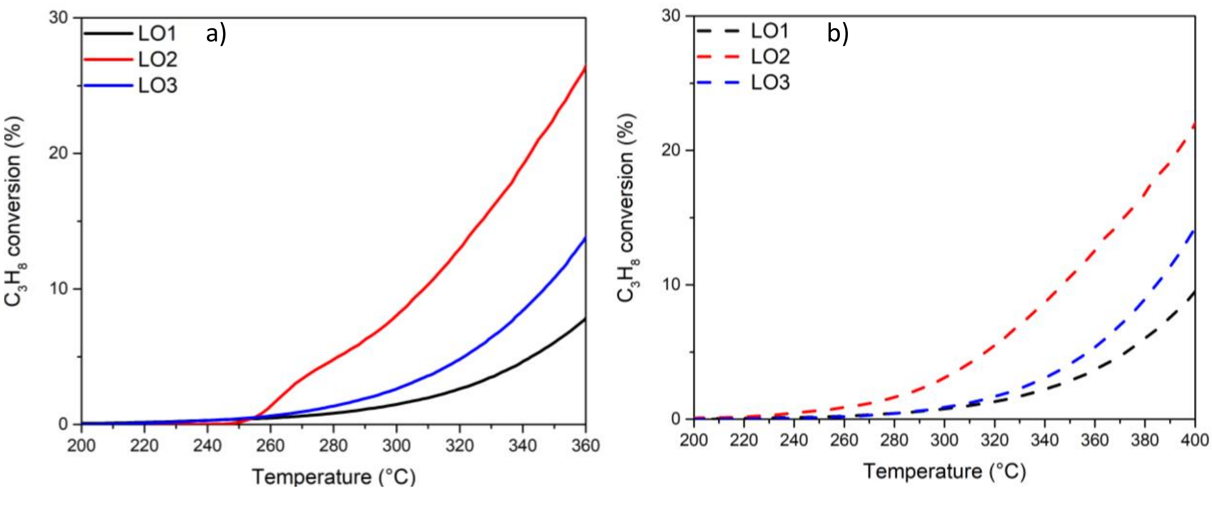

Figure S8. Variation of the propane conversion as a function of the temperature: a) on Pd-HS up to 360 °C and b) on Pd-LS up to 400 °C. The reduction step between LO1 and LO2 was performed in H_2.

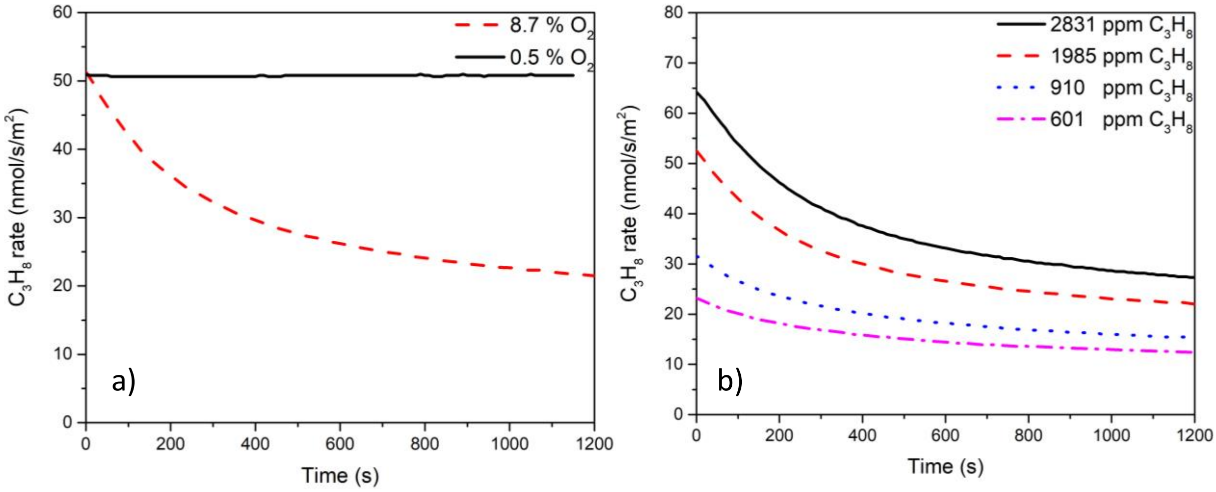

Figure S9. Variation of the intrinsic reaction rate as a function of time for Pd-HS at 360 °C a) for different oxygen concentrations using 1985 ± 9 ppm of C_3H_8 and b) for different C_3H_8 concentration using 8.7 vol% of O_2.