

Interaction of O₂ with reduced ceria nanoparticles at 100–400 K: Fast oxidation of Ce³⁺ ions and dissolved H₂

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SUPPORTING INFORMATION

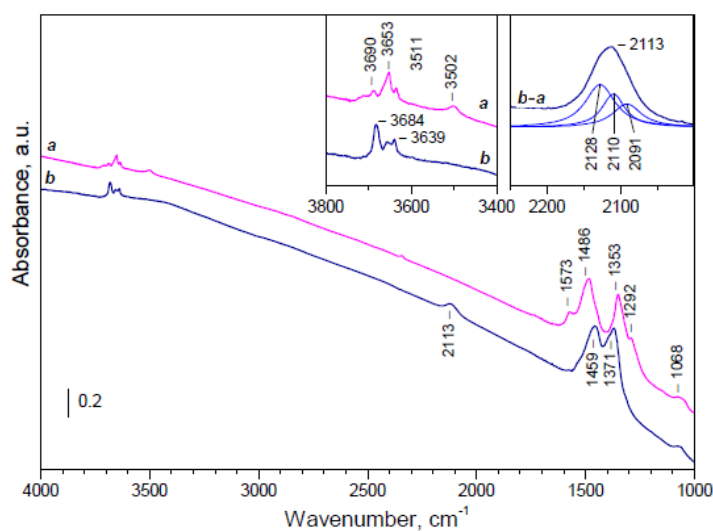


Figure S1. FTIR spectra of CeO₂-NR after activation (a) and reduction (b) at 773 K.

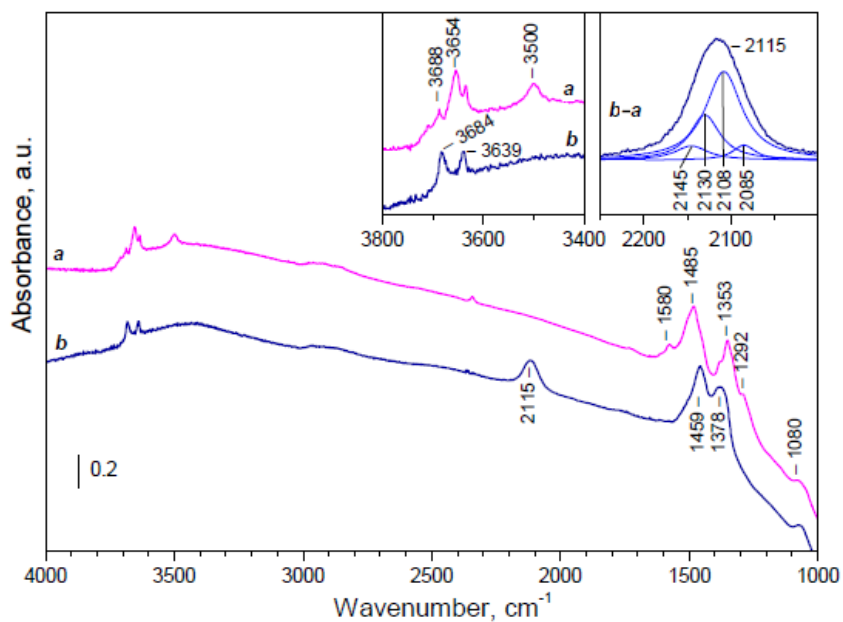


Figure S2. FTIR spectra of CeO₂-NP after activation (a) and reduction (b) at 773 K.

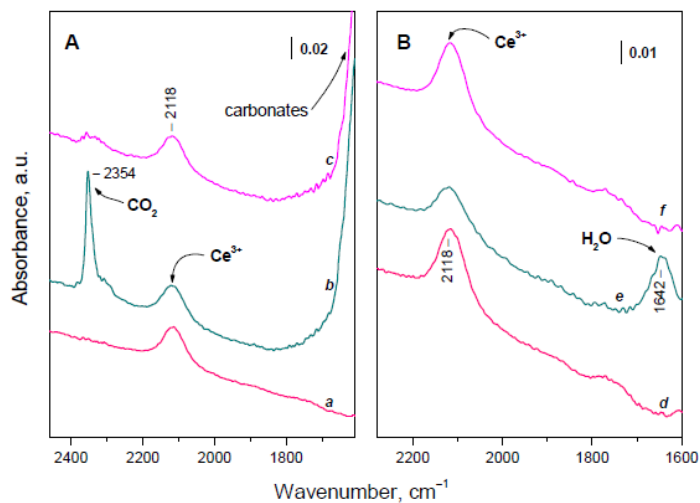


Figure S3. A. FTIR spectra of reduced CeO₂-NR (a), in the presence of 2 mbar CO₂ (b) and after evacuation at ambient temperature (c). B. FTIR spectra of reduced CeO₂-NR (a), in the presence of 2 mbar H₂O (b) and after evacuation at 773 K (c).

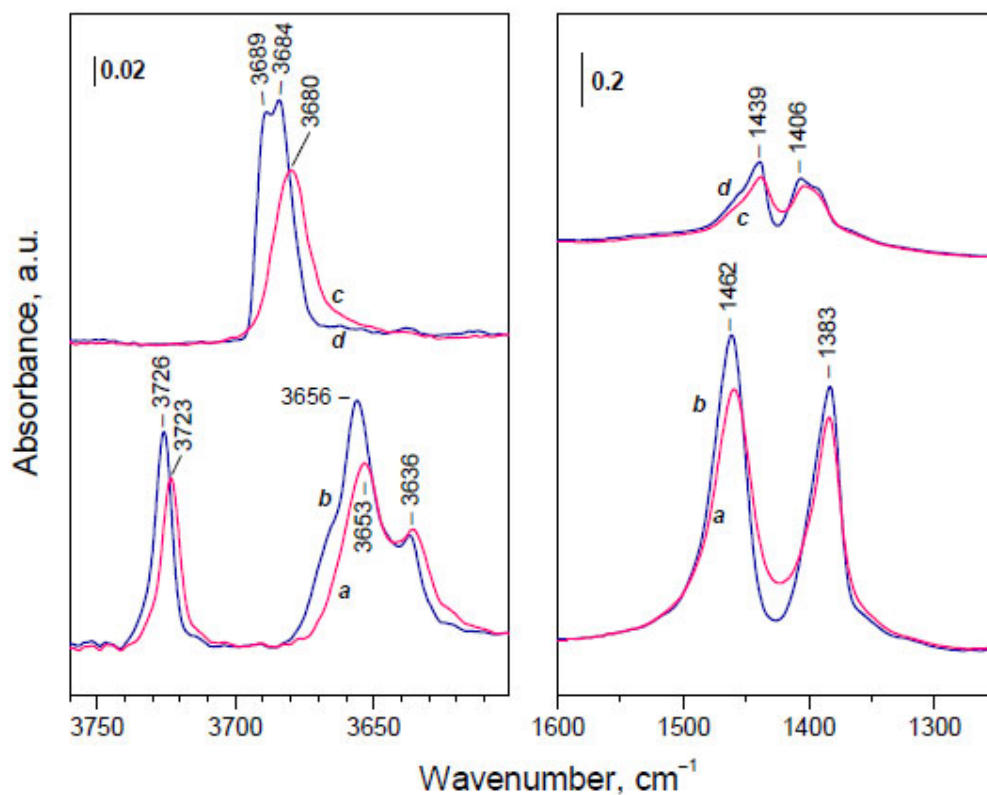


Figure S4. FTIR spectra of activated (a, b) and reduced CeO₂-NP (c, d). Spectra registered at ambient temperature (a, c) and at 100 K (b, d).

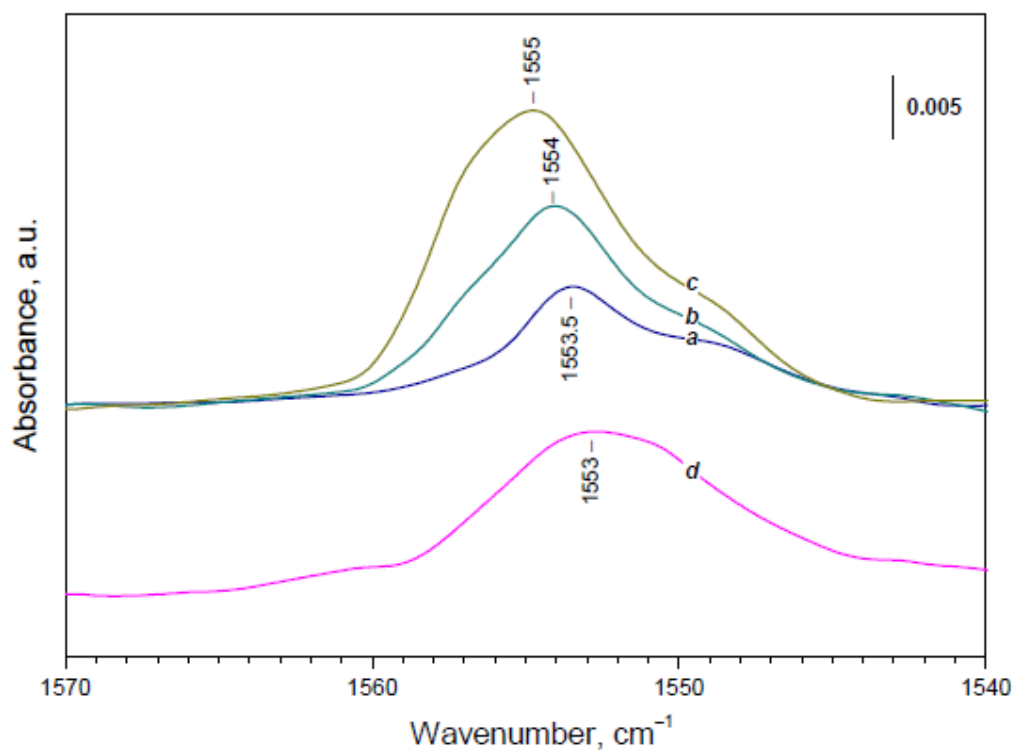


Figure S5. FTIR spectra of O₂ adsorbed at 100 K on CeO₂-NC evacuated at 573 K (a), 673 K (b) and 773 K (c) and on reduced CeO₂-NC evacuated at 773 K (d).

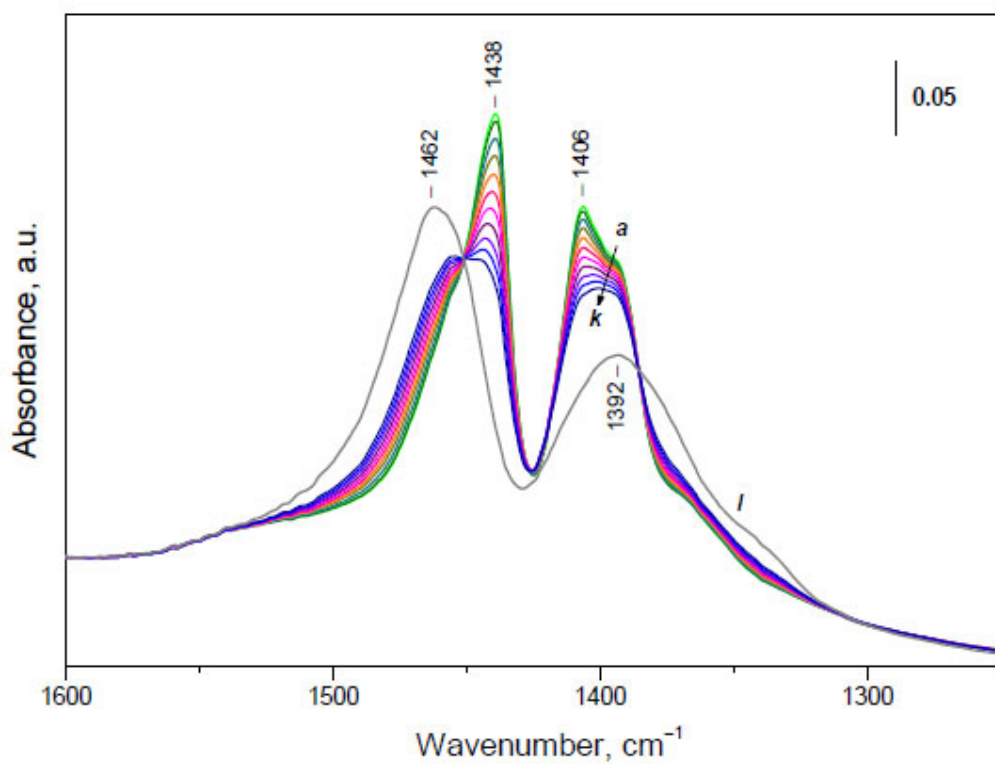


Figure S6. FTIR spectra of reduced CeO₂-NP sample (carbonate region, 100 K) (a), after successive introduction of small doses of 18O₂ (b-k) and in the presence of 2 mbar 18O₂ (l).

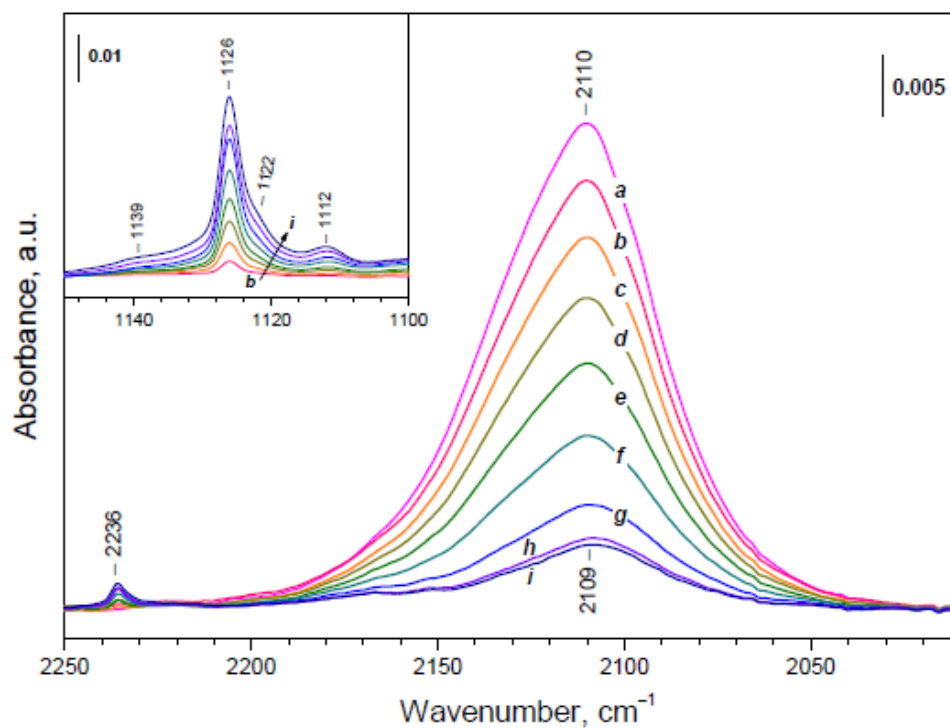


Figure S7. FTIR spectra of reduced $\text{CeO}_2\text{-NC}$ (a), changes in the spectra after successive addition of small doses of oxygen (b-h) and in presence of 8 mbar O_2 . The spectra are background corrected.

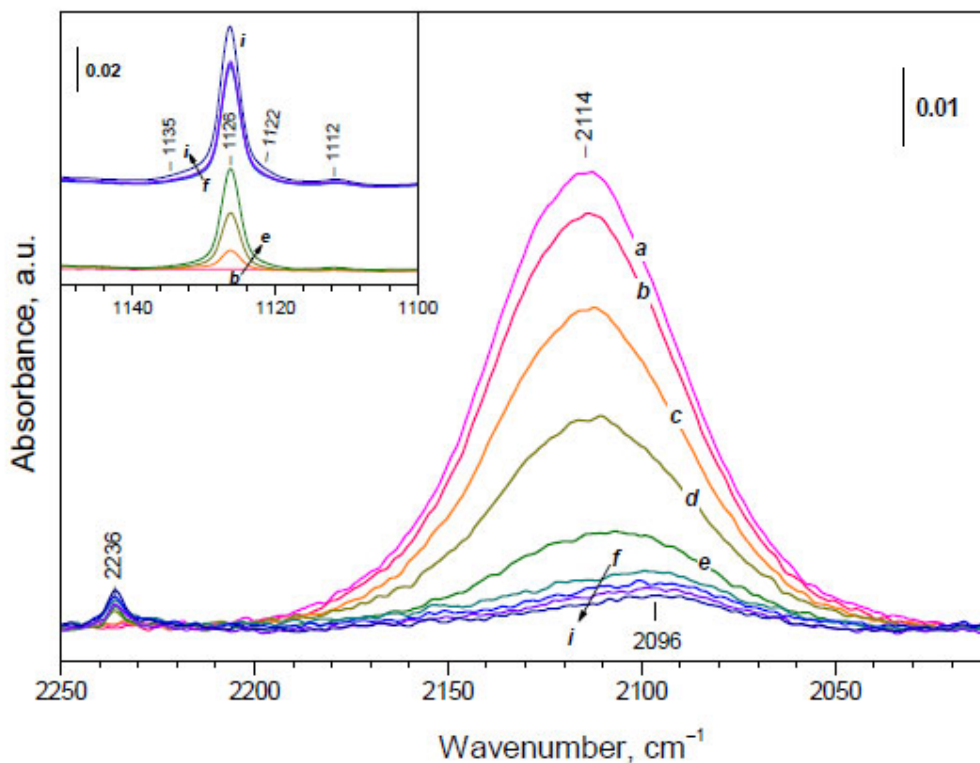


Figure S8. FTIR spectra of reduced $\text{CeO}_2\text{-NR}$ (a), changes in the spectra after successive addition of small doses of oxygen (b-h) and in presence of 8 mbar O_2 . The spectra in the inset are background corrected

Table S1. Consumption of H₂ (a.u.) during the TPR of the ceria samples below (surface reduction) and above 923 K (bulk reduction).

Sample	Area of 1-st TPR Peak (T = 500 - 923 K)	Area of 2-nd TPR Peak (T = 923 - 1373 K) ^a	Percentage of the first peak	Surface area, m ² g ⁻¹
CeO ₂ -NP	7426	7998	48.1	140
CeO ₂ -NR	5543	6898	44.6	110
CeO ₂ -NC	2902	10840	21.1	27