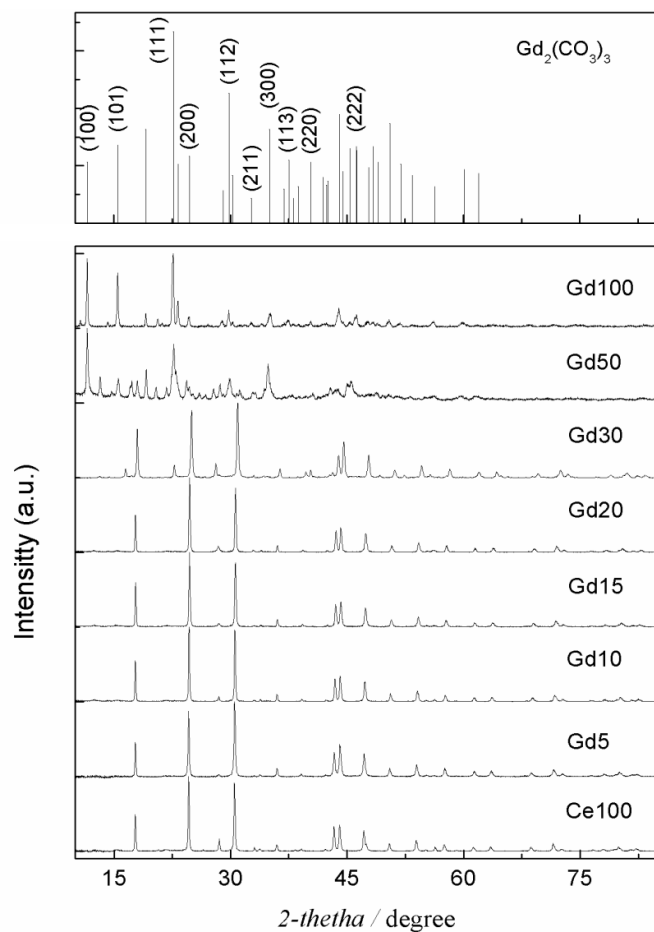


**Hexagonal  $Ce_{1-x}Ln_x(OH)CO_3$  as highly efficient precursors of nanocrystalline Ln(III-IV)-substituted ceria.**

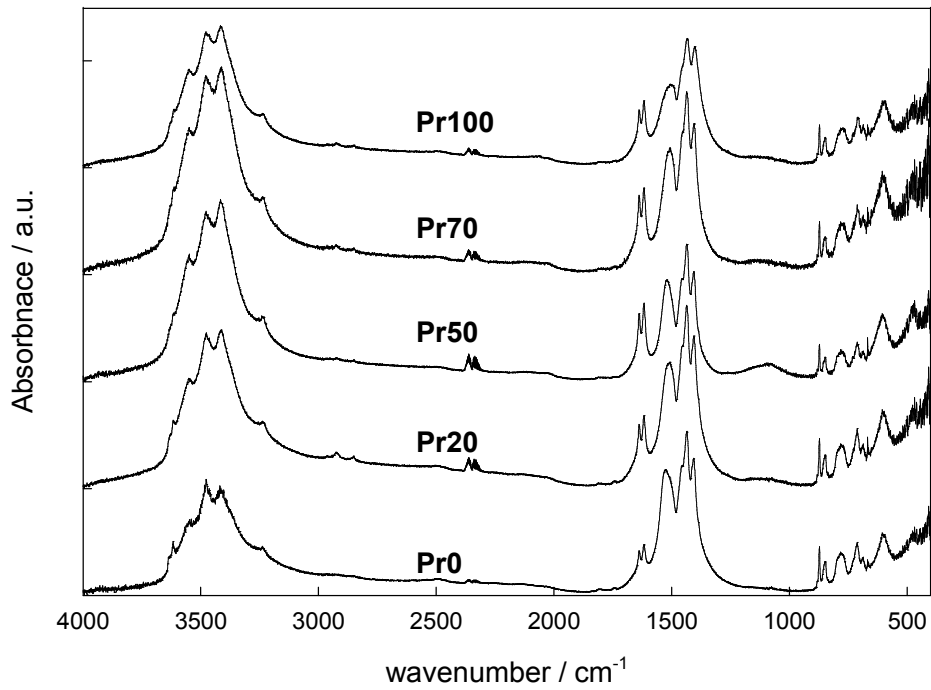
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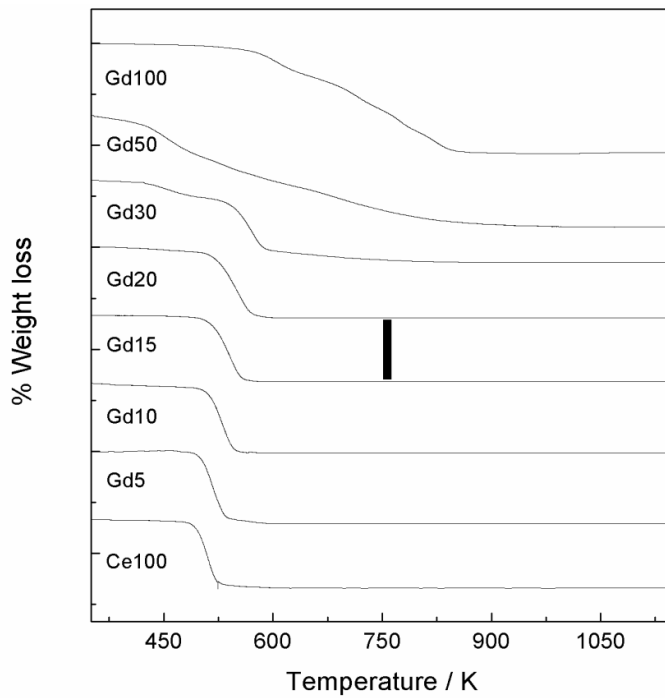
<sup>2</sup> Centro Interdisciplinario de Nanociencia y Nanotecnología.



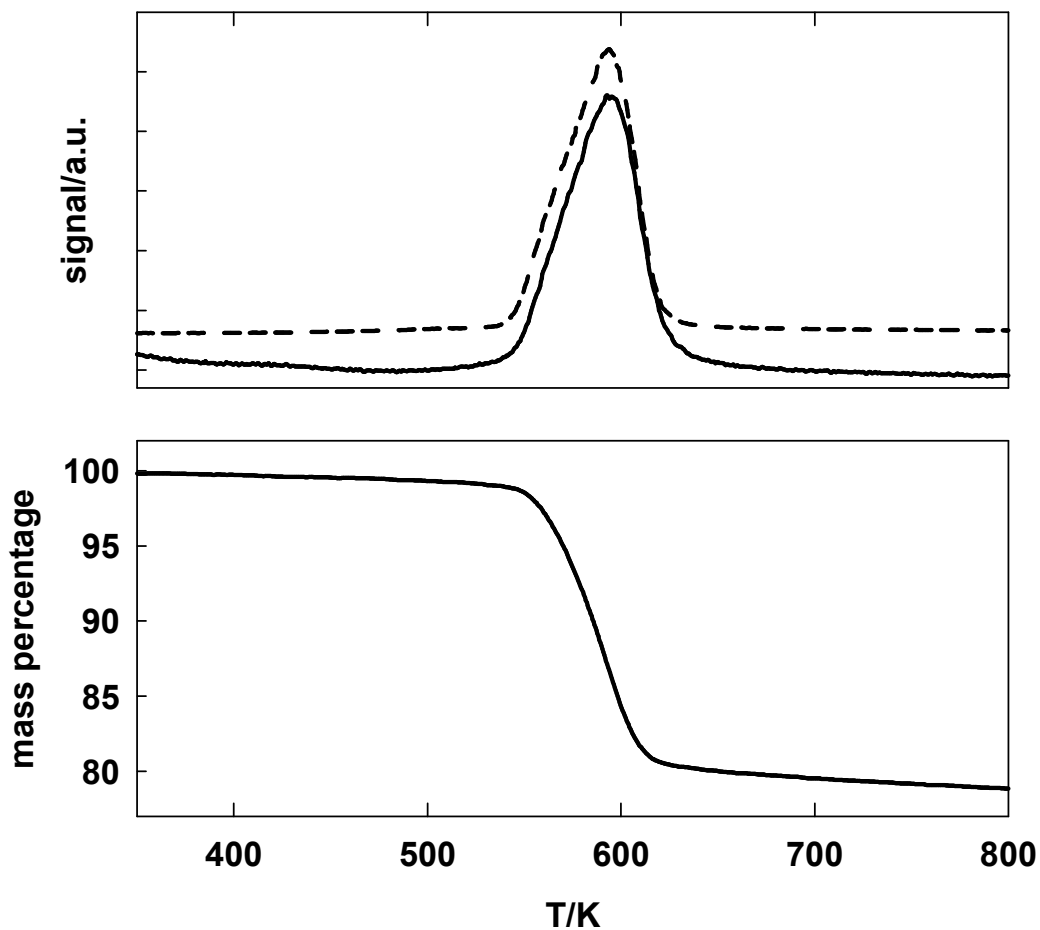
**Figure S1.** Lower panel: PXRD patterns of binary precursors Ce(III)-Gd(III) with increasing Gd(III) content. Upper panel depicts the main reflections of  $Gd_2(CO_3)_3$  (PDF 37-0559).



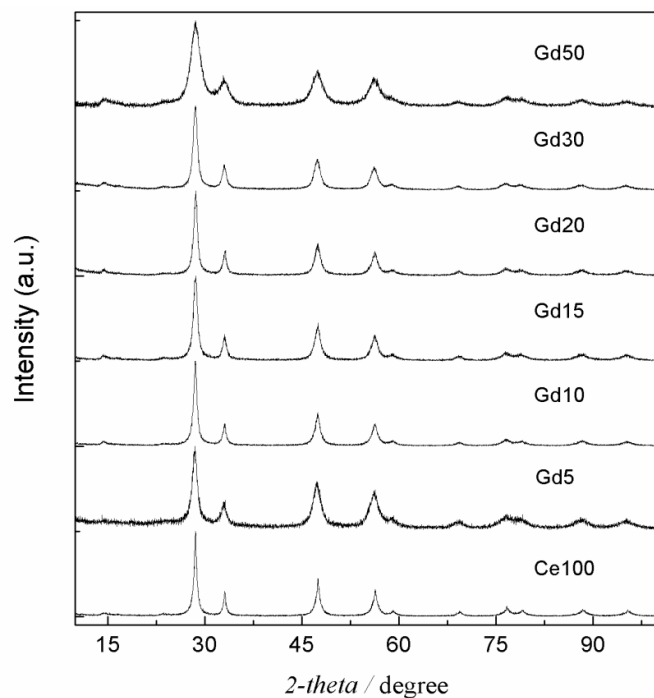
**Figure S2.** FTIR spectra recorded fro representative  $\text{Ce}_{1-x}\text{Pr}_x(\text{OH})\text{CO}_3$ .



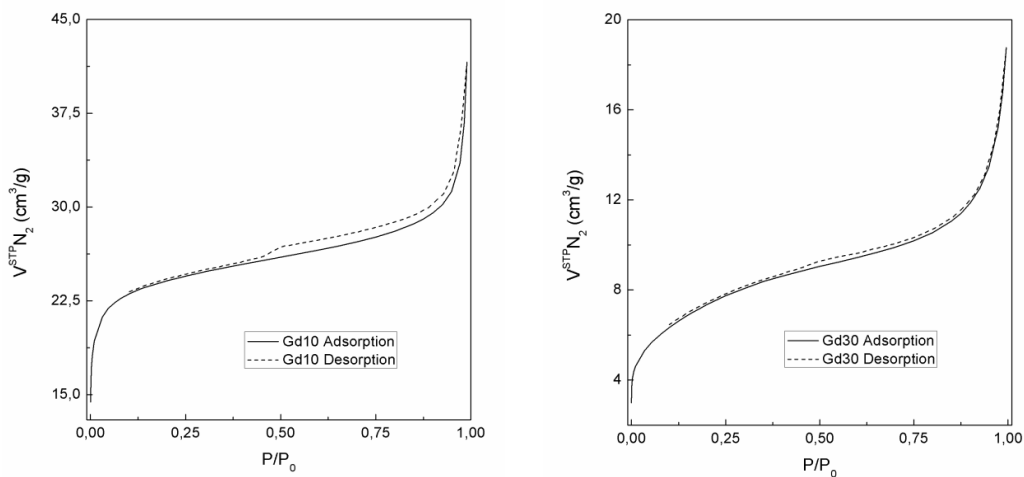
**Figure S3.** Thermogravimetric trace of  $Ce_{1-x}Gd_x(OH)CO_3$  samples recorded at  $1\text{ K min}^{-1}$  under air atmosphere.



**Figure S4.** Upper panel: evolution of  $m/z$  44 (dashed line) and 18 (full line) and mass (lower panel) as a function of temperature, during decomposition of sample Gd20 recorded at  $5\text{ K min}^{-1}$  under air atmosphere.



**Figure S5.** PXRD patterns of the oxides obtained after decomposition of  $\text{Ce}_{1-x}\text{Gd}_x(\text{OH})\text{CO}_3$  precursors in air at 723 K.



**Figure S6.** Typical  $\text{N}_2$  sorption isotherms of the oxides obtained after decomposition of samples Gd10 (left) and Gd30 (right) at 723 K.

**Table S1.** Specific surface area obtained from N<sub>2</sub> isotherms recorded at 77 K.

<b>Sample</b>	<b>Langmuir Surface Area (m<sup>2</sup>/g)</b>	<b>Sample</b>	<b>Langmuir Surface Area (m<sup>2</sup>/g)</b>
<b>Ce100</b>	90	<b>Sm15</b>	91
<b>Pr5</b>	111	<b>Sm20</b>	80
<b>Pr10</b>	116	<b>Sm30</b>	58
<b>Pr15</b>	118	<b>Sm50</b>	15
<b>Pr20</b>	73	<b>Gd10</b>	111
<b>Pr30</b>	100	<b>Gd15</b>	116
<b>Pr50</b>	15	<b>Gd20</b>	110
<b>Sm5</b>	129	<b>Gd30</b>	39
<b>Sm10</b>	105		