Supplementary materials

Supporting Information

Stability limit of the layered-perovskite structure in $Ln_2Ti_2O_7$ (Ln=Lanthanide) thin films grown on (110)-oriented $SrTiO_3$ substrates by sol-gel route

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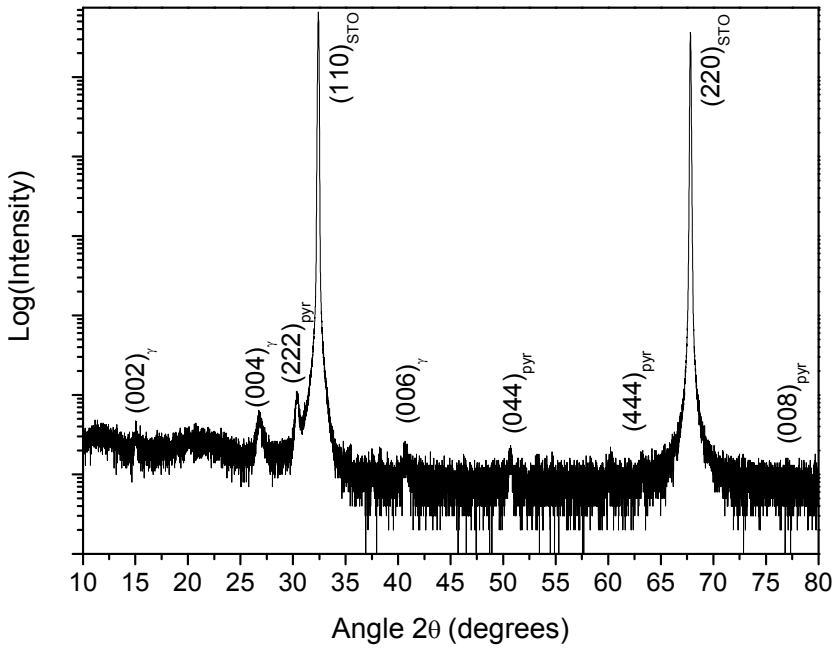

Figure S1. XRD pattern of $Gd_2Ti_2O_7$ thin film directly inserted and annealed at 950°C

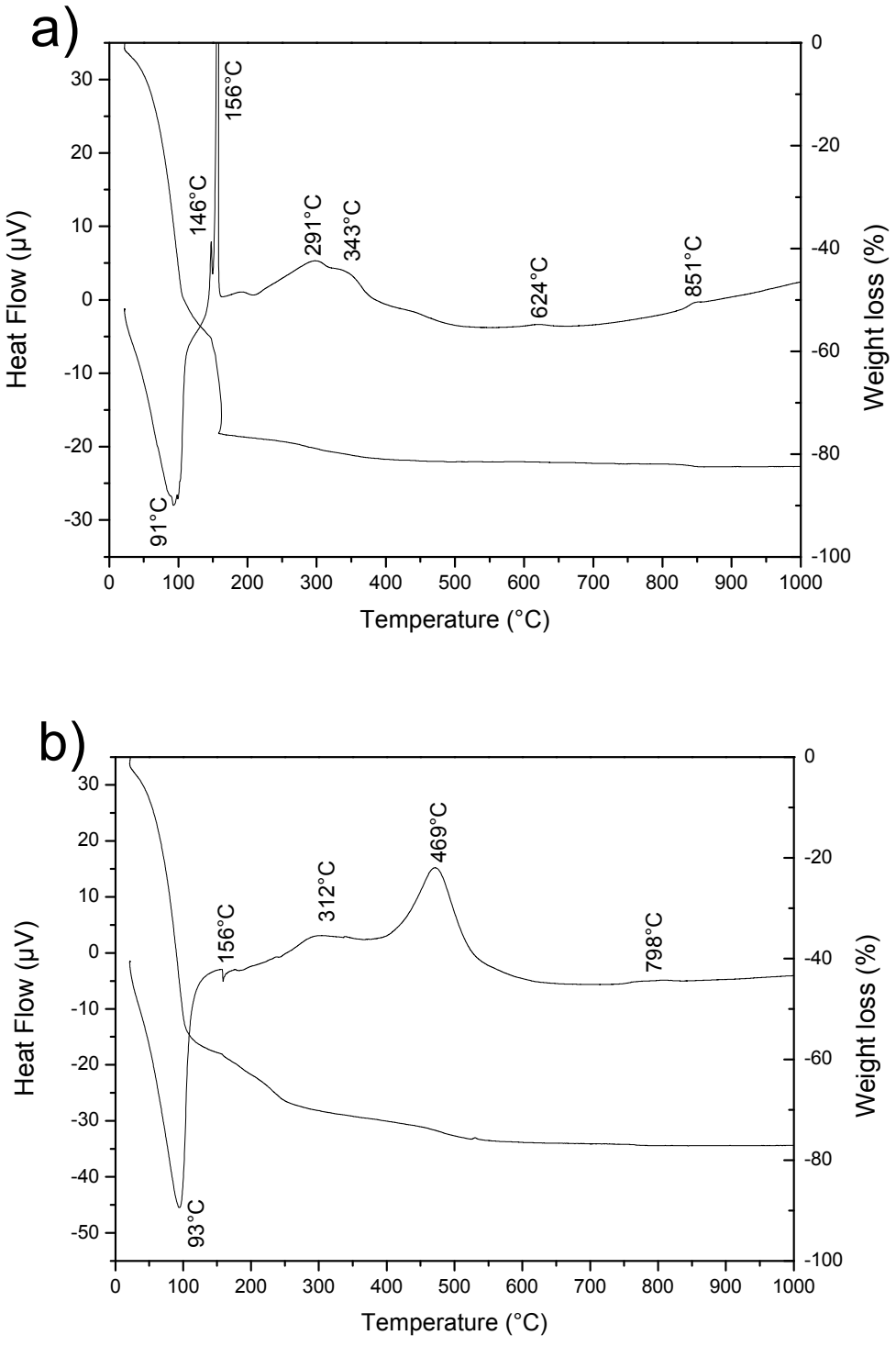

Figure S2. Thermo-Gravimetric and Differential Thermal Analysis (TG-DTA) plot: (a) of GdTO-Nitrates ; (b) of GdTO-Chlorides.

Thermo-gravimetric analysis (TGA) and Differential Thermal Analysis (DTA) on the gels were performed. TGA and DTA plots of GdTO-Nitrate and GdTO-Chloride precursors are shown in the figure S2. For GTO-Nitrate, an endothermic peak in DTA and a fast weight loss appear at around 80°C-90°C. It corresponds to the water loss and the release of 2-methoxyethanol solvent. Secondly, a sharp exothermic peak is visible around 140-160°C. This peak is likely to be due to the evaporation of the 2,4-pentadione and the gel formation. Then, three broad exothermic peaks centered at 291°C, 343°C and 624°C are attributed to the combustion of organic groups present in the gel (these combustions accompanied by low mass loss). Finally, an exothermic peak is observed at 851°C. This corresponds to the formation of the $Gd_2Ti_2O_7$ oxide in the pyrochlore phase. Here, a correlation is made with the HTXRD measurements (Figure 3.d) where the pyrochlore phase appears at 850°C. Similar results were already obtained in a previous study on LaTO and NdTO.[12] For GTO-Chloride, the DTA is different, with always an evaporation of 2-methoxyethanol solvent around 100°C, but with combustion of organic groups occurring primarily at 470°C.