Electronic Supplementary Information (ESI†)

Thermal, Vibrational and Optical Properties of $PrLuO_3$ Interlanthanides from Hydrothermally-Derived Precursors

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Fig. S1 (a) XRD pattern and (b) Raman spectrum for the hydrothermally-synthesized $Pr(OH)_3$ and LuO(OH) precursors obtained at 250°C, showing the coexistence of these two starting phases (as indicated).

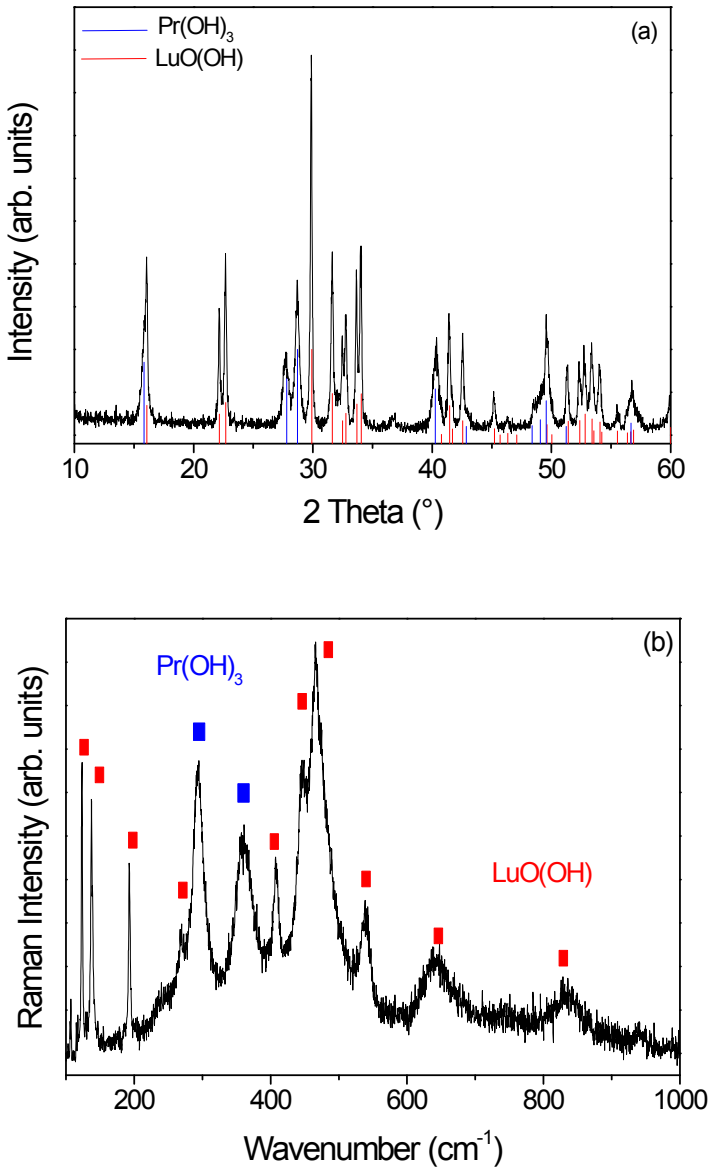

Fig. S2 DTA/TGA heating runs of the hydrothermally-derived precursors identified by XRD and Raman scattering. The endothermic peaks correspond to the loss of hydroxyl groups toward the formation of lanthanide oxides.

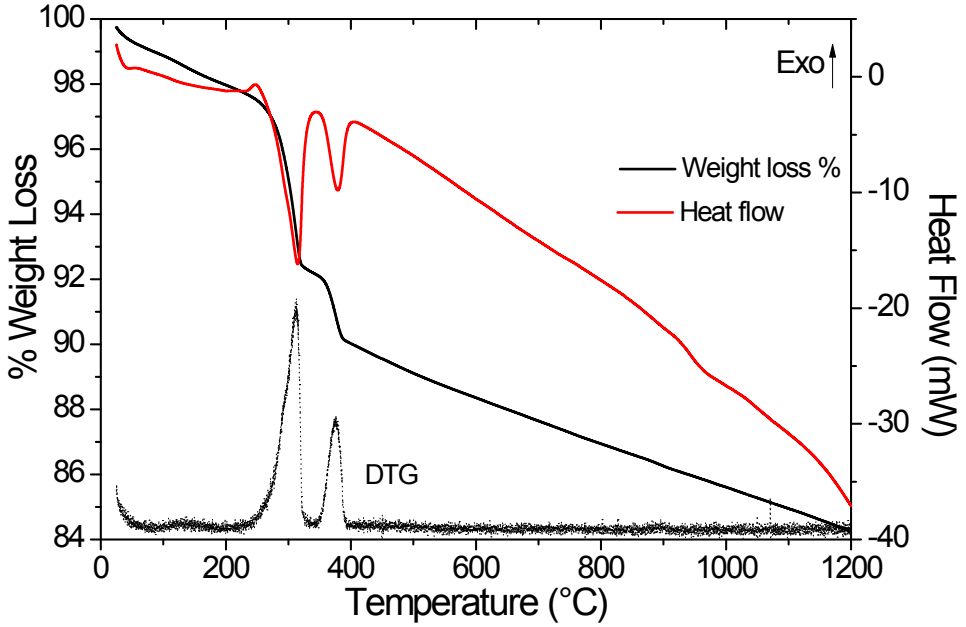

Fig. S3 (a,c) Excitation (λ_{em}=655 nm, corrected for lamp intensity) and (b,d) absorption spectra of the $PrLuO_3$ samples annealed at (a,b) 1400°C (mixed $P6_3/mmc$ + *Pnma* sample) and (c,d) 1600°C (phase-pure *Pnma* sample). Insets in (a) and (c) show non-corrected excitation spectra in linear scale; (b) and (d) were mathematically calculated from diffuse reflectance spectra of powders diluted in MgO, taking pure MgO as blank.

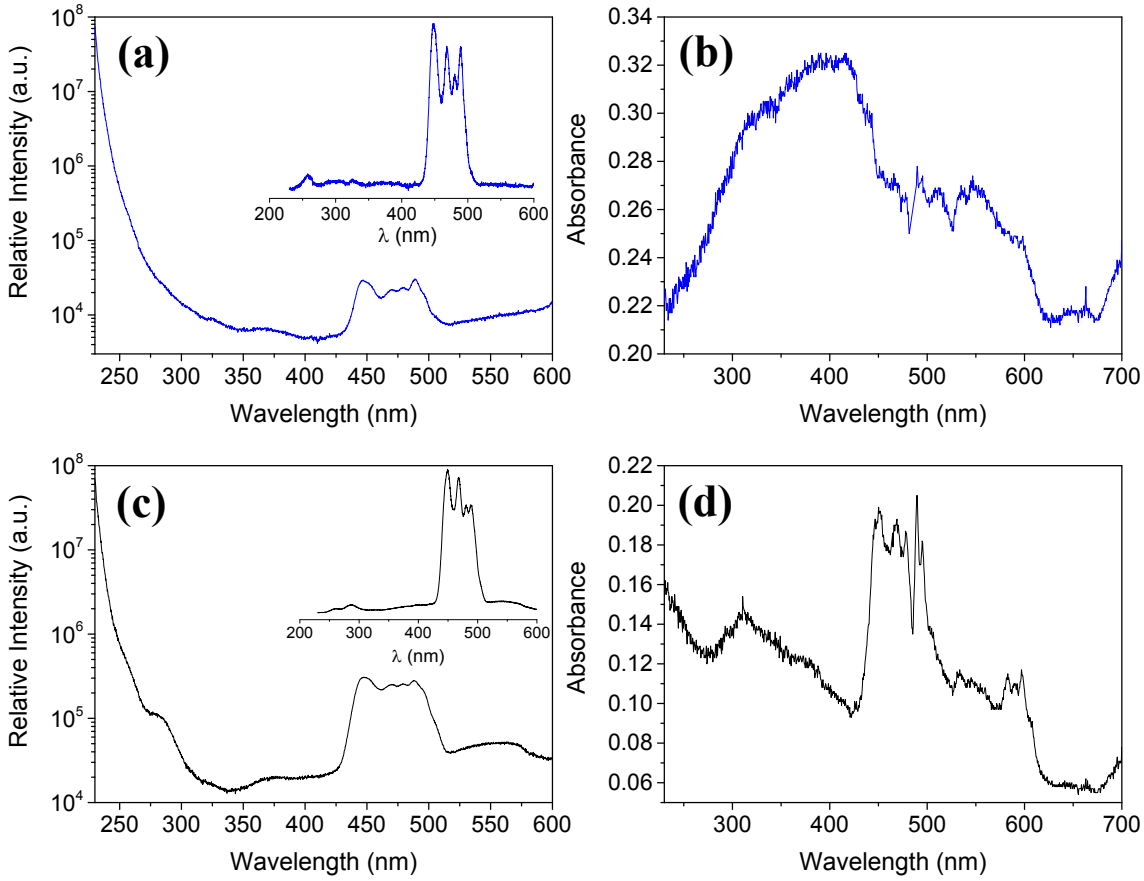

Fig. S4 Emission spectrum of the $PrLuO_3$ sample annealed at 1600°C monitoring the $^3P_0 \rightarrow {}^3F_2$ transition under 290°C (black squares), and Gaussian peak fits of Stark components (green lines) and cumulative fit peak (red line).