

## Supporting information

### Exploring optical properties of $\text{La}_2\text{Hf}_2\text{O}_7:\text{Pr}^{3+}$ nanoparticles under UV and X-ray excitations for potential lighting and scintillating applications

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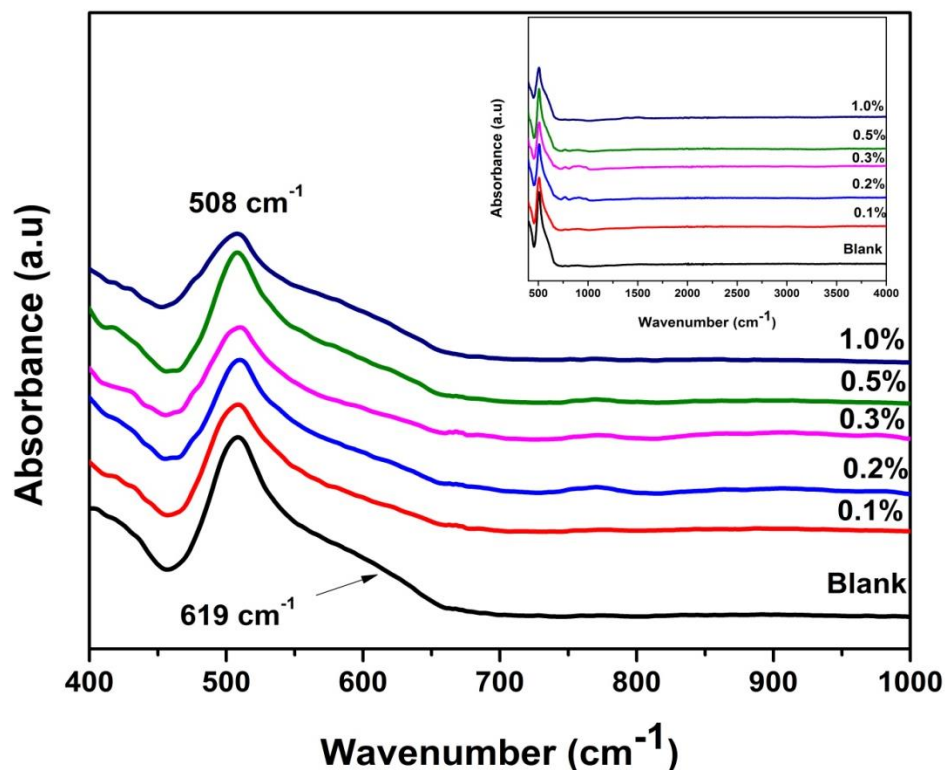
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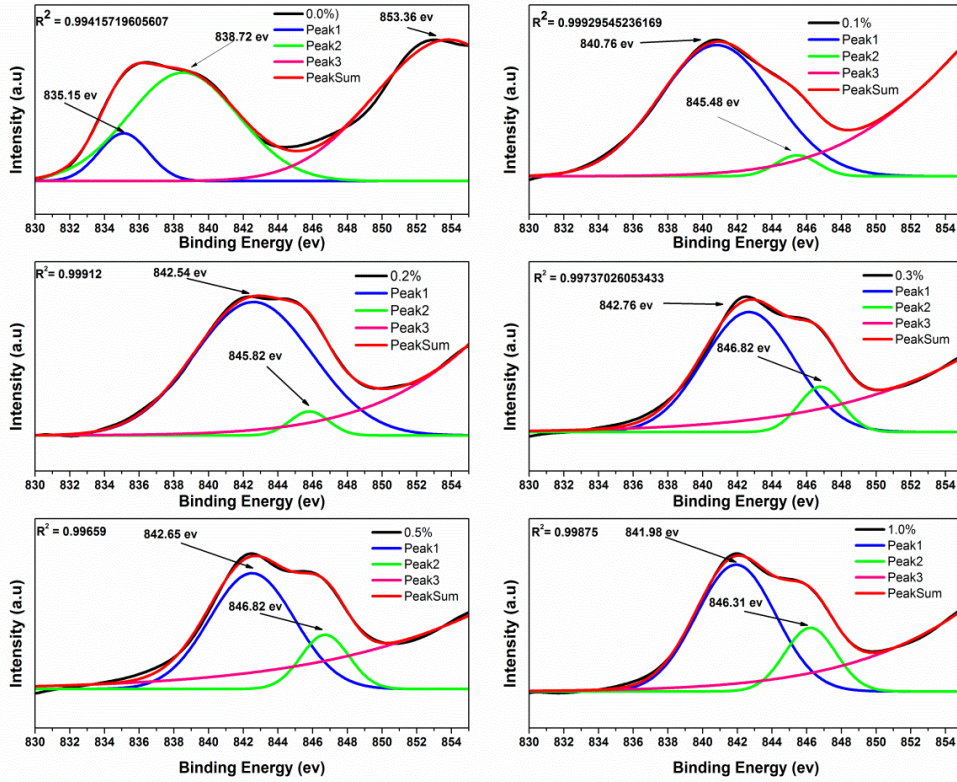
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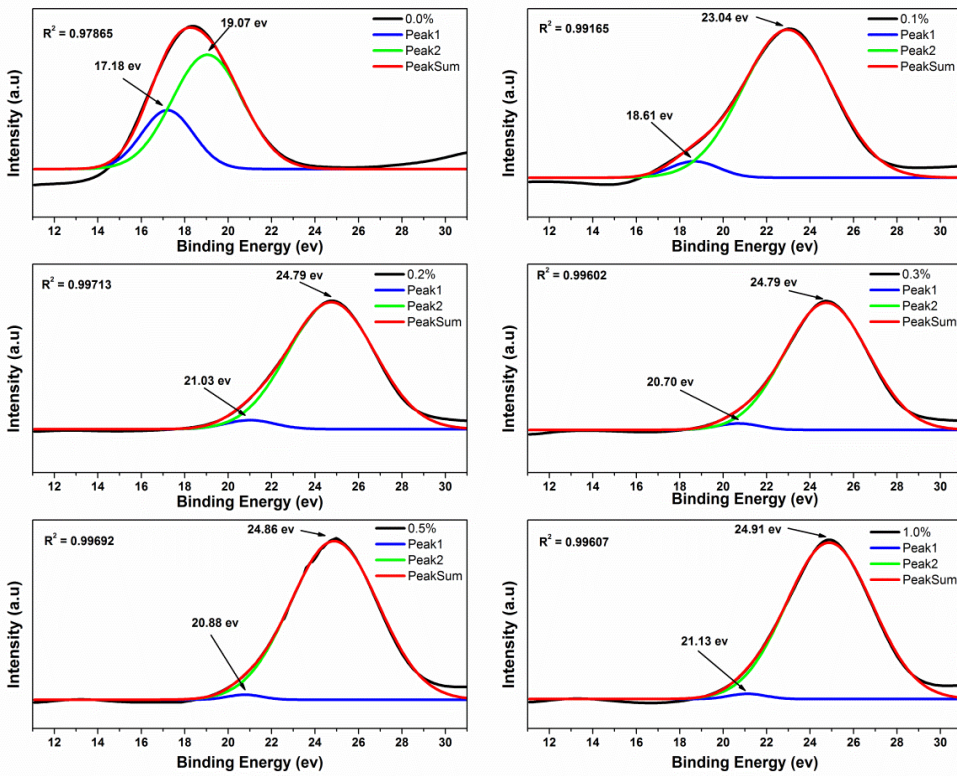


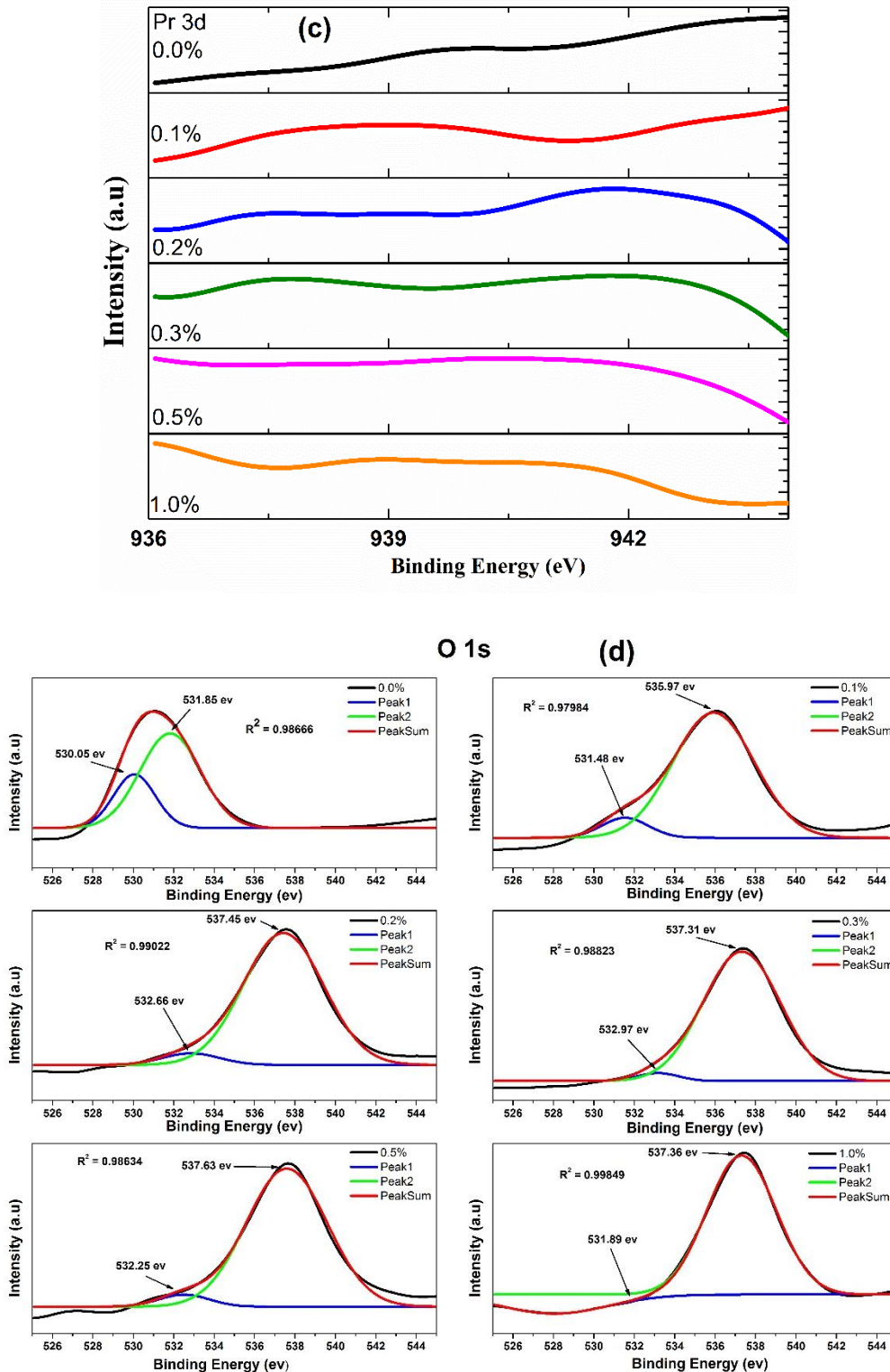
**Figure S1.** FTIR spectra of the  $\text{La}_2\text{Hf}_2\text{O}_7:\text{xmol}\%\text{Pr}^{3+}$  ( $x = 0, 0.1, 0.2, 0.3, 0.5,$  and  $1.0$ ) NPs after calcinated at  $900^\circ\text{C}$ . Inset shows full range spectra depicting no peaks from OH or nitrogen.

### La 3d (a)



### Hf 4f (b)





**Figure S2.** (a) XPS spectra for core electrons of (a) La 3d, (b) Hf 4f, (c) Pr 3d, and (d) O 1s of the  $\text{La}_2\text{Hf}_2\text{O}_7:x\%\text{Pr}^{3+}$  ( $x = 0, 0.1, 0.2, 0.3, 0.5, \text{ and } 1.0$ ) NPs.