

Supporting Information

Systematic Synthesis and Characterization of Single-Crystal Lanthanide Orthophosphate Nanowires

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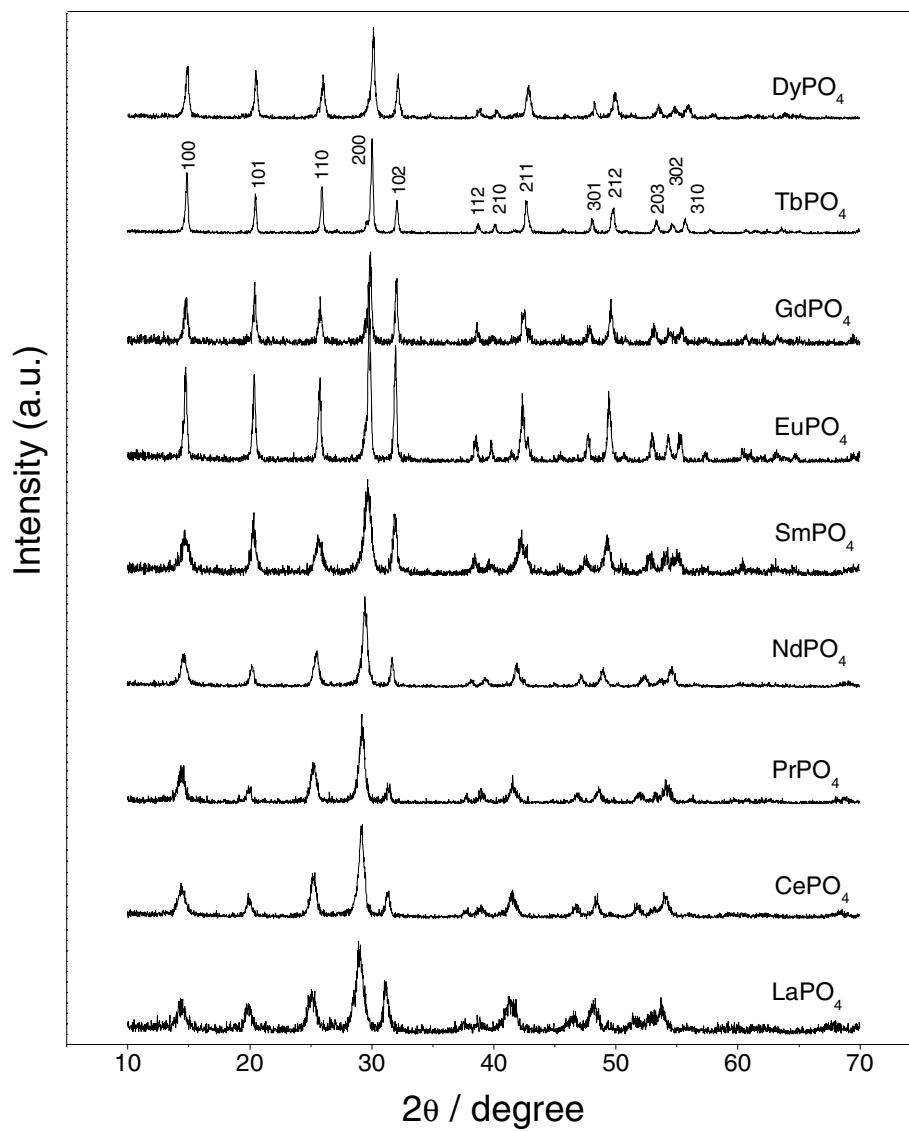


Figure S1. XRD patterns of the obtained hexagonal LnPO₄ (Ln = La → Dy, from bottom to top) nanowires.

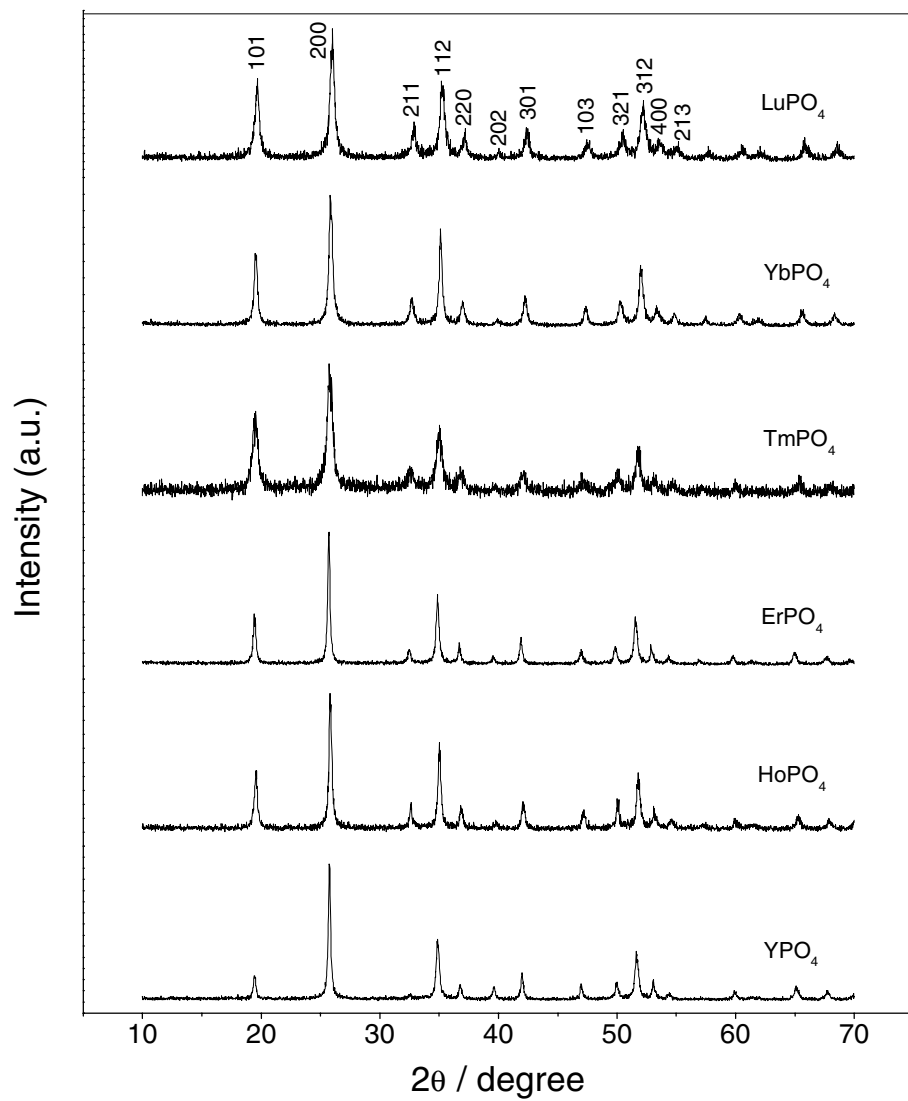


Figure S2. XRD patterns of the as-synthesized tetragonal (Ho → Lu, Y)PO₄ crystals.

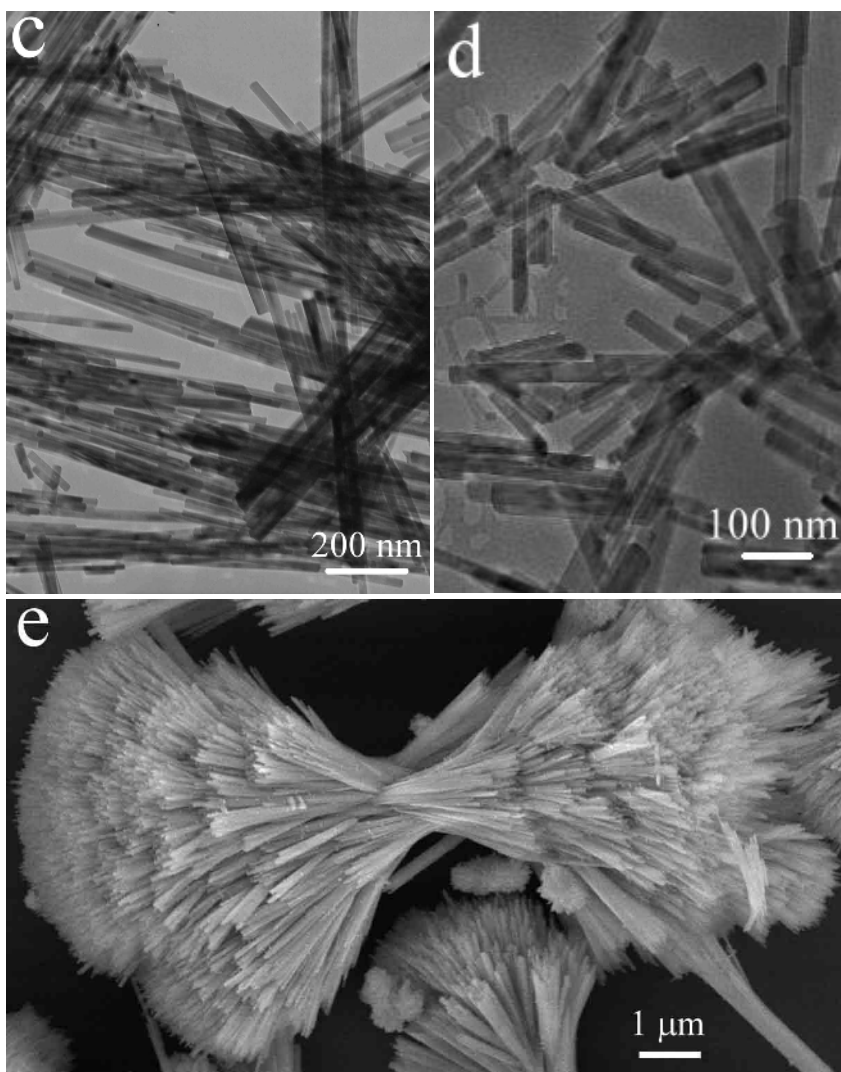


Figure S3. TEM images of the obtained hexagonal NdPO_4 (c), and EuPO_4 (d) nanowires or nanorods. (e) SEM image of the obtained hexagonal DyPO_4 nanowires.

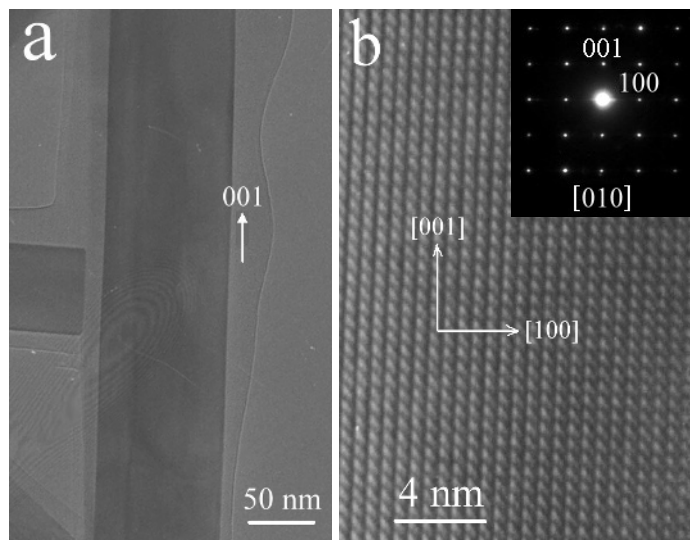


Figure S4. (a) TEM image of the obtained GdPO_4 nanowires. (b) HRTEM image of a single nanowire with the clear lattice fringes of [001] with spacing $d = 0.633$ nm, and [100] with spacing 0.596 nm. Inset in (b) The corresponding electron diffraction shows a single crystal recorded from the [010] zone axis.

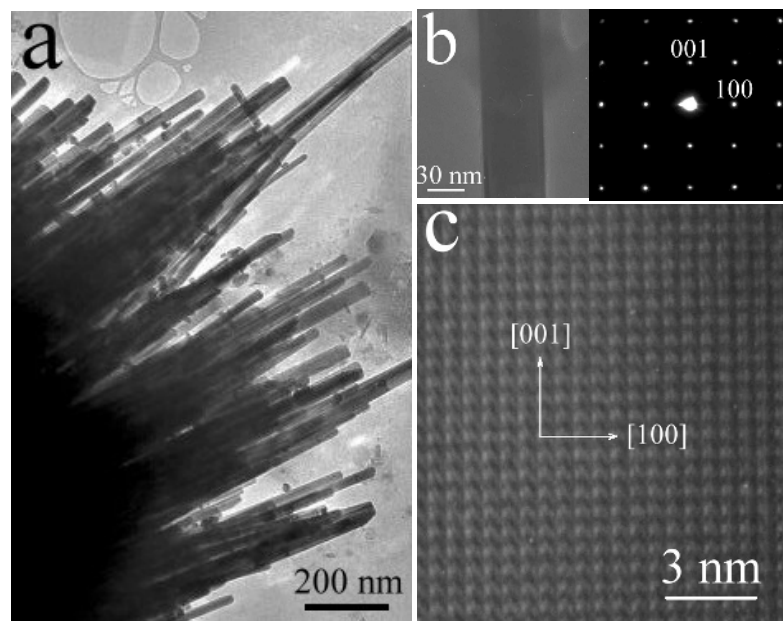


Figure S5. (a) Low-magnification TEM image of the obtained DyPO₄ nanowires. (b) TEM image of a single nanowire. (c) HRTEM image of a single nanowire with the clear lattice fringes of [001] with spacing $d = 0.627$ nm, and [100] with spacing 0.585 nm. Inset in (b) The corresponding electron diffraction shows a single crystal recorded from the [010] zone axis.

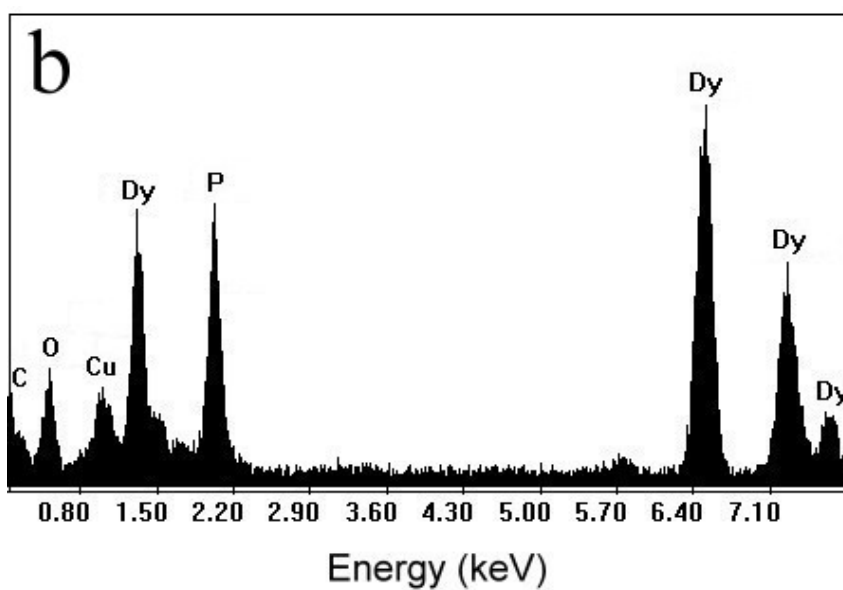
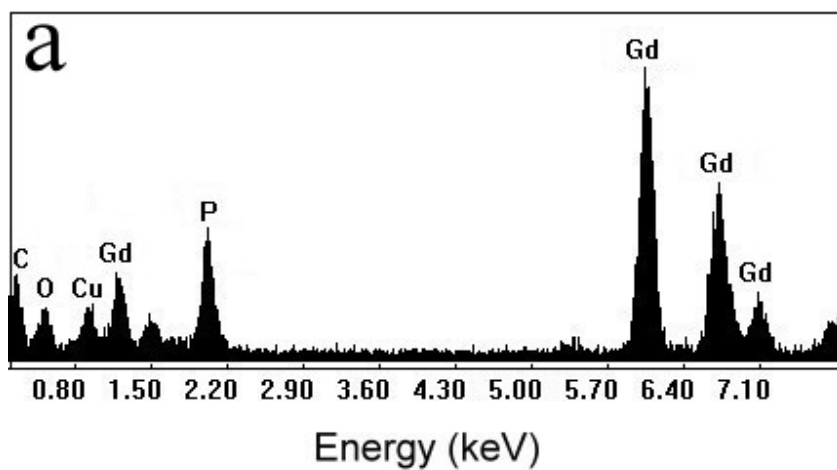
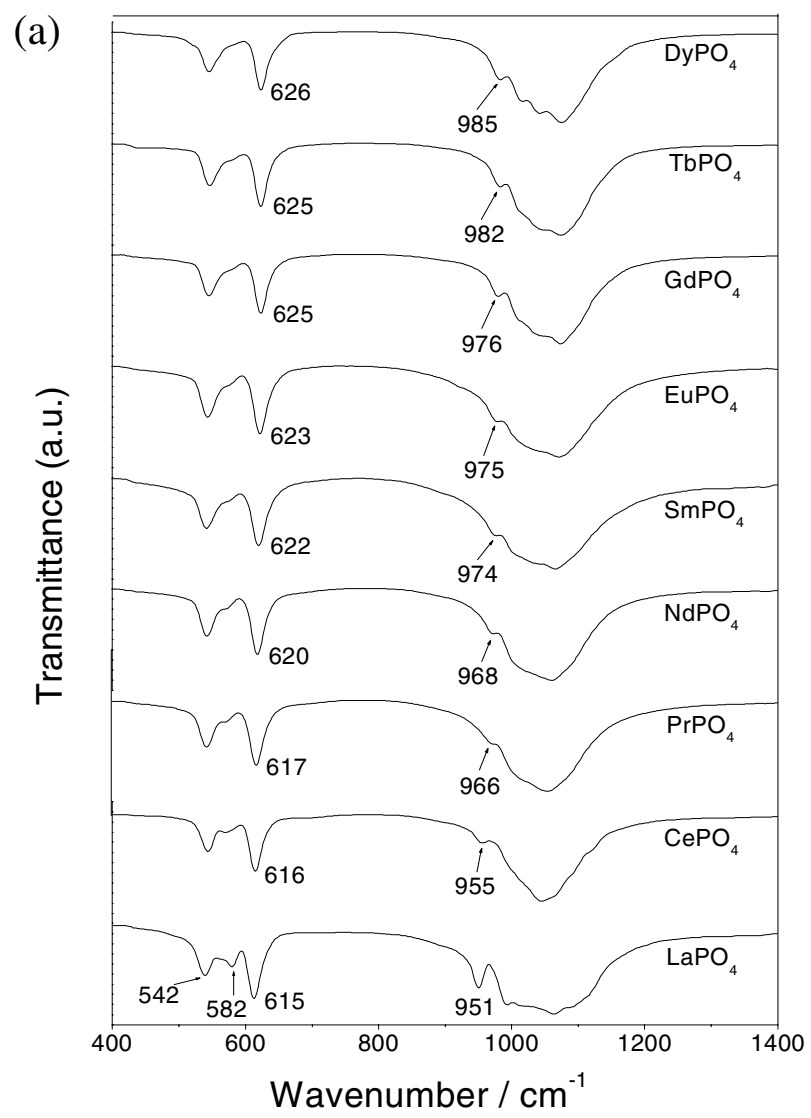


Figure S6. EDS spectrum of the obtained GdPO₄ nanowires (a) and DyPO₄ nanowires (b). Cu peak raised from the TEM grid.



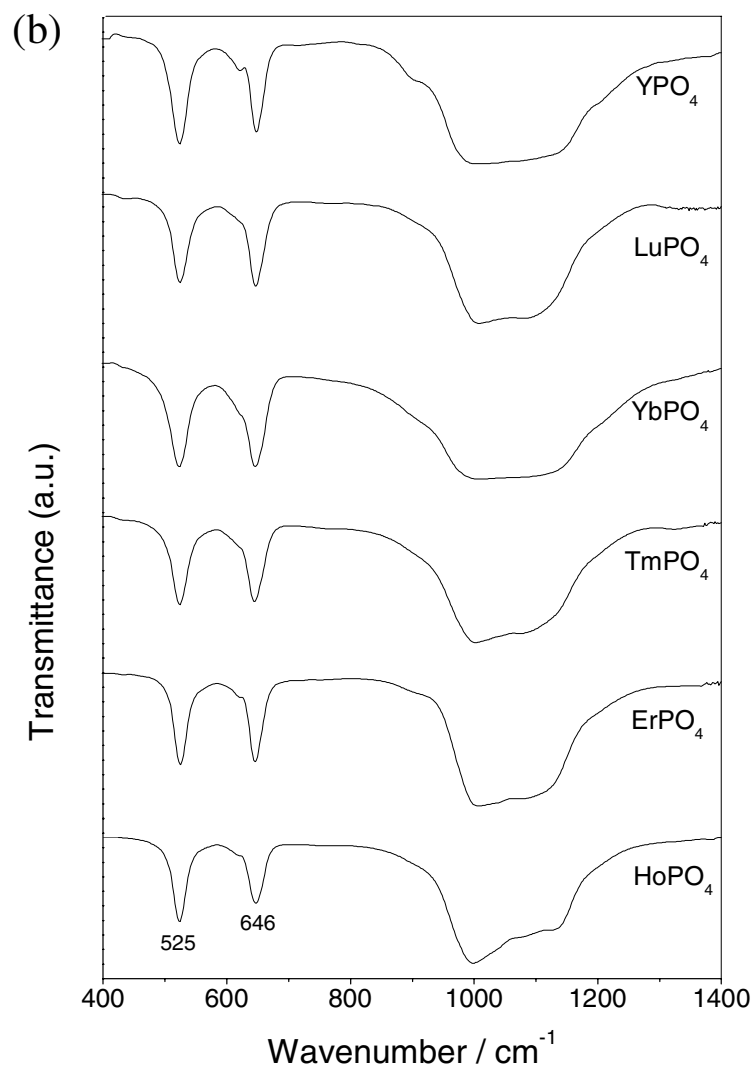


Figure S7. FTIR spectra of hexagonal LnPO_4 ($\text{Ln} = \text{La} \rightarrow \text{Dy}$) nanowires/nanorods (a) and tetragonal ($\text{Ho} \rightarrow \text{Lu}, \text{Y}$) PO_4 particles (b).

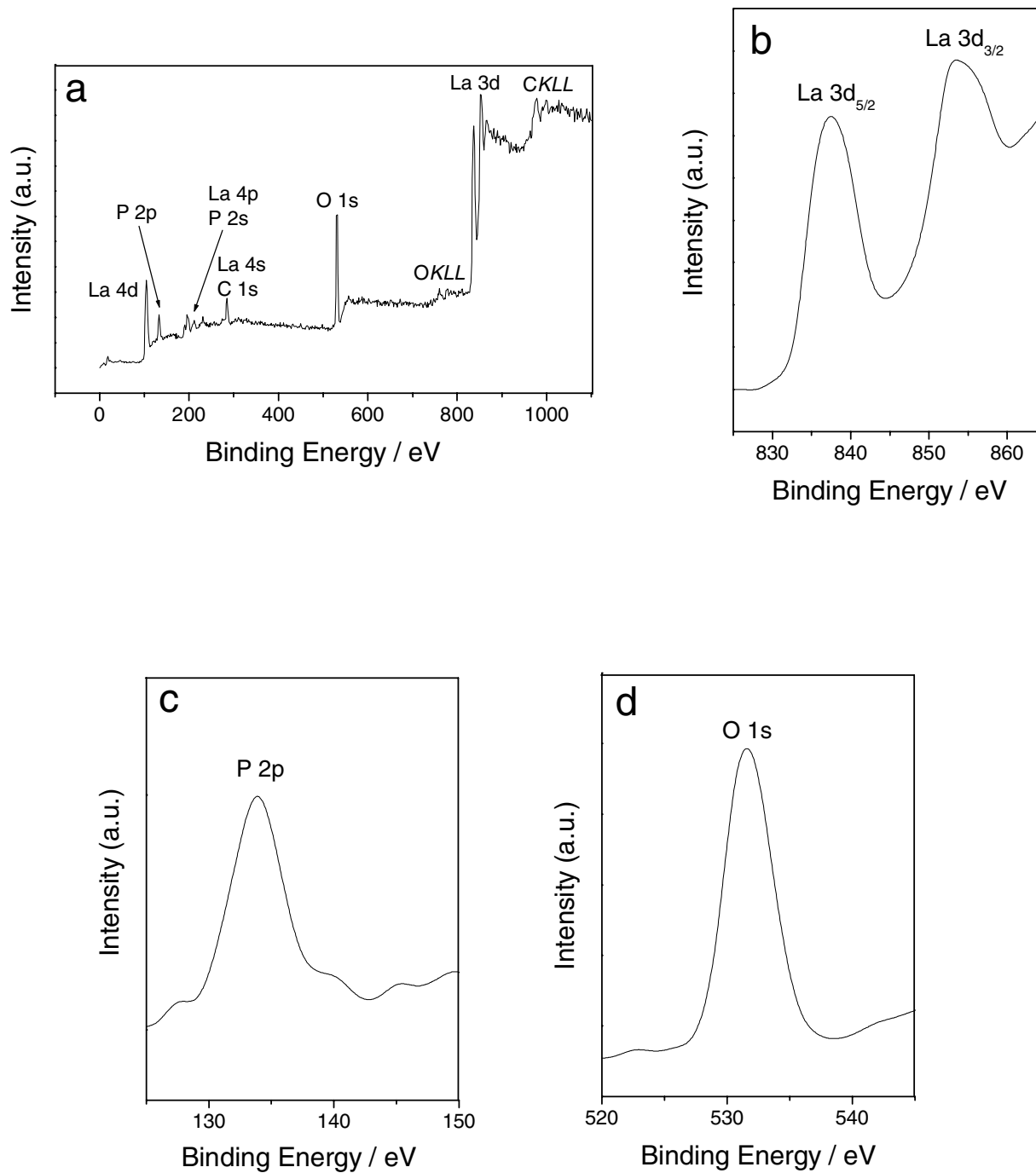


Figure S8. The XPS spectra of the obtained hexagonal LaPO_4 nanowires. (a) Survey XPS spectrum. (b) La 3d. (c) P 2p. (d) O 1s.

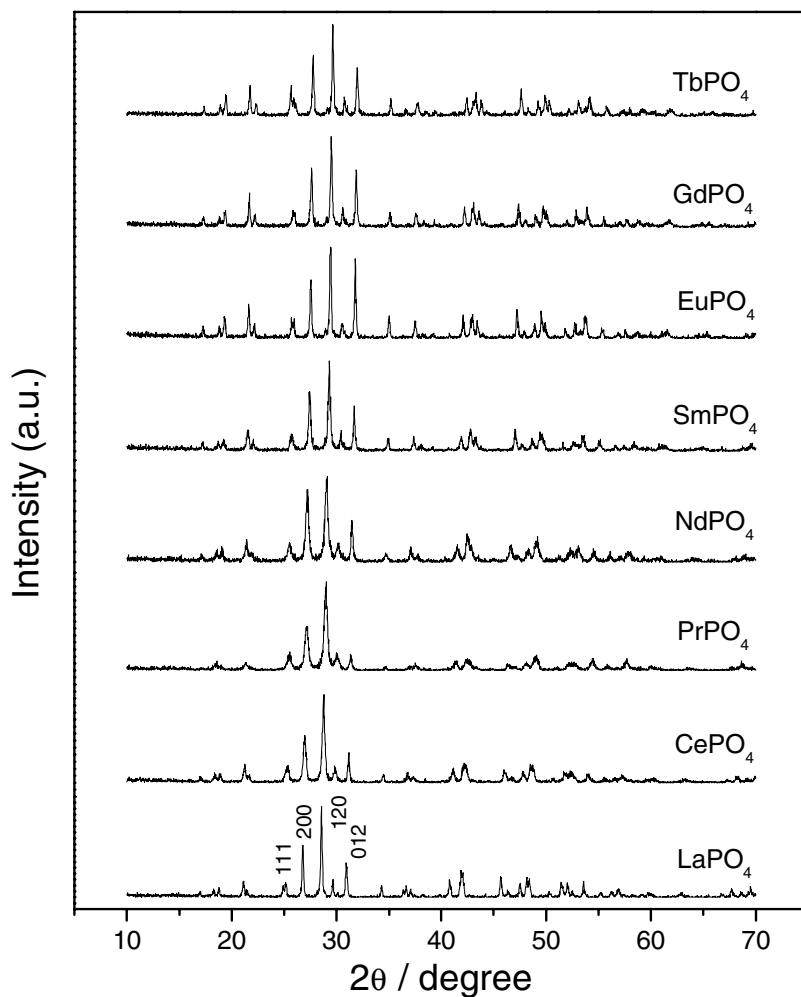


Figure S9. XRD patterns of monoclinic LnPO₄ (Ln = La → Tb) products produced from as-made hexagonal LnPO₄ nanowires/nanorods after calcination at 900 °C.

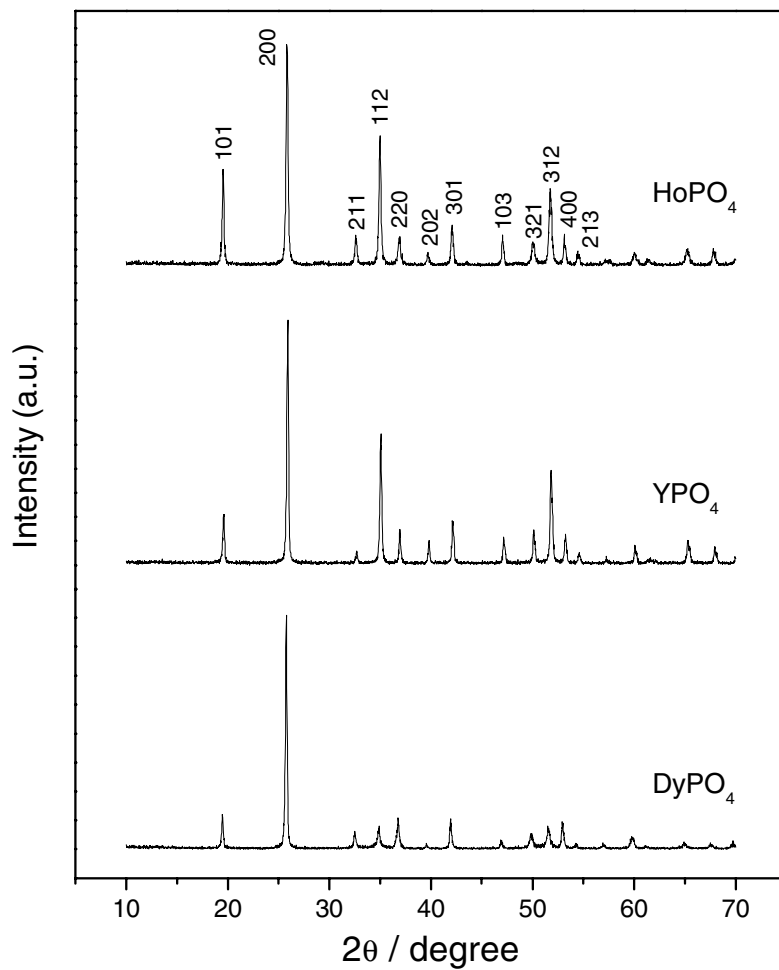


Figure S10. XRD patterns of tetragonal DyPO₄, YPO₄ and HoPO₄ products obtained from as-prepared hexagonal DyPO₄, tetragonal YPO₄ and HoPO₄ samples after calcination at 900 °C.

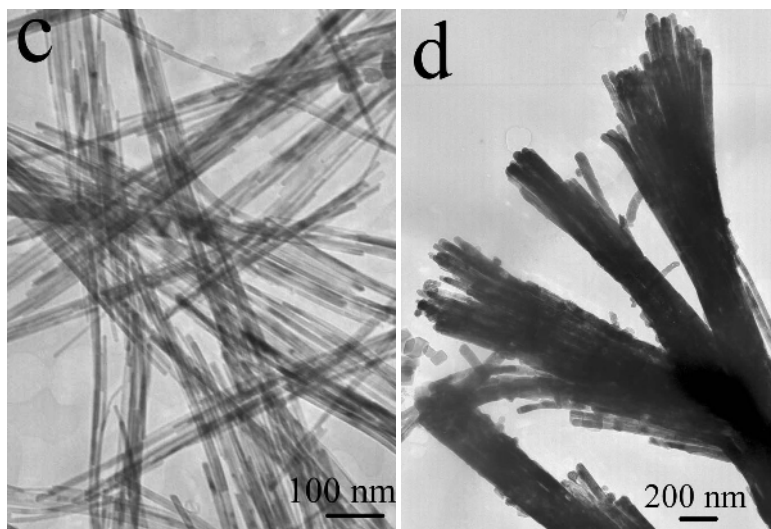


Figure S11. TEM images of monoclinic LnPO_4 nanowires/nanorods obtained by calcination of as-made corresponding products at 900 °C. (c) PrPO_4 , (d) DyPO_4 .

