

# Supplementary Material (ESI) for New Journal of Chemistry  
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## Supporting Information

### **Microwave Approach For The Synthesis of Rhabdophane-Type Lanthanide Ortho Phosphate [Ln = La, Ce, Nd, Sm, Eu, Gd and Tb] Nanorods Under Solvothermal Condition and Their Characterization**

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**Running Title:** Microwave-assisted synthesis of rhabdophane-type lanthanide  
orthophosphate.

**Figure Captions:**

**Figure S1.** HRTEM images of as-synthesized  $\text{LnPO}_4 \cdot n\text{H}_2\text{O}$  ( $\text{Ln} = \text{Ce}, \text{Sm}$  and  $\text{Tb}$ ) [(D1, D2 & D3)  $\rightarrow$  Ce, (E1, E2 & E3)  $\rightarrow$  Sm, (F1, F2 & F3)  $\rightarrow$  Tb] nanorods, obtained after microwave heating. (i) nanorods (D1, E1 & F1), (ii) HRTEM image of a single nanorod (D2, E2 & F2) with clear lattice fringes: (D2  $\rightarrow$  Ce,  $d_{102} = 0.284$  nm and  $d_{110} = 0.342$  nm; (E2)  $\rightarrow$  Sm,  $d_{200} = 0.30$  nm and  $d_{102} = 0.278$  nm, (F2)  $\rightarrow$  Tb,  $d_{102} = 0.278$  nm and  $d_{101} = 0.426$  nm, and (iii) the corresponding electron diffraction (D3, E3 & F3).

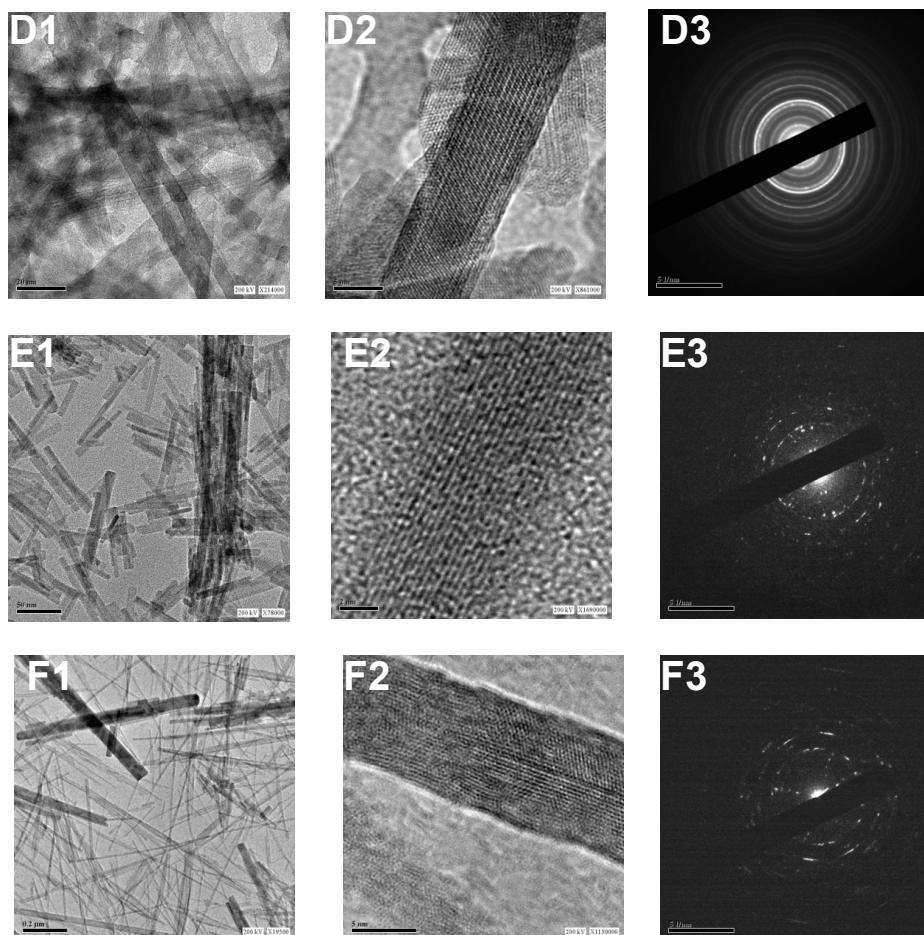
**Figure S2.** FTIR spectra of as-synthesized hexagonal  $\text{LnPO}_4 \cdot n\text{H}_2\text{O}$  nanorods/nanowires: (a) La, (b) Ce, (c) Nd, (d) Sm, (e) Eu, (f) Gd, and (g) Tb and (h) tetragonal  $\text{ErPO}_4 \cdot n\text{H}_2\text{O}$  nanoparticles by microwave heating.

**Figure S3** Raman spectra of as-synthesized hexagonal  $\text{LnPO}_4 \cdot n\text{H}_2\text{O}$  ( $\text{Ln} = \text{La}, \text{Ce}, \text{Nd}, \text{Sm}, \text{Eu}, \text{Gd}$  and  $\text{Tb}$ ) nanorods/nanowires and tetragonal  $\text{ErPO}_4 \cdot n\text{H}_2\text{O}$  nanoparticles by microwave heating.

**Figure S4.** X-ray photoelectron spectra (XPS) of as-synthesized hexagonal  $\text{CePO}_4 \cdot n\text{H}_2\text{O}$  nanorods/nanowires by microwave heating: (a) survey spectrum, (b) Ce 3d region, (c) P 2P<sub>3/2</sub>, (d) O 1s.

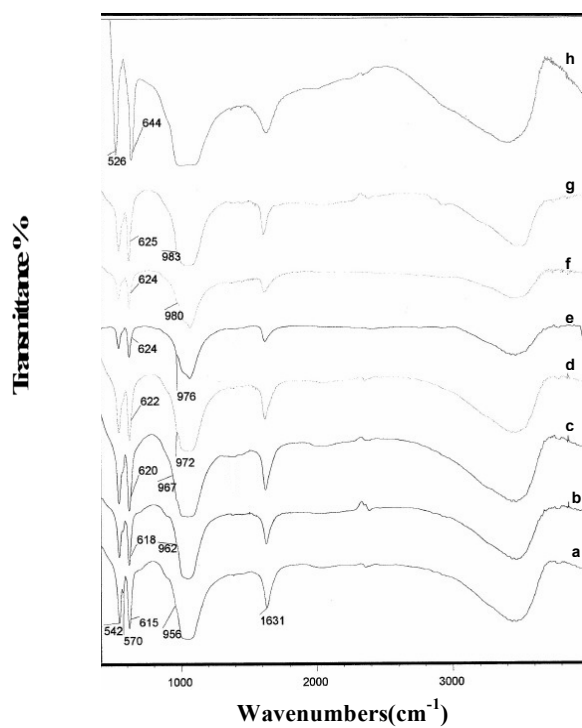
**Figure S5.** X-ray photoelectron spectra (XPS) of as-synthesized hexagonal  $\text{NdPO}_4 \cdot n\text{H}_2\text{O}$  nanorods/nanowires by microwave heating: (a) survey spectrum, (b) Nd 3d region, (c) P 2P<sub>3/2</sub>, (d) O 1s.

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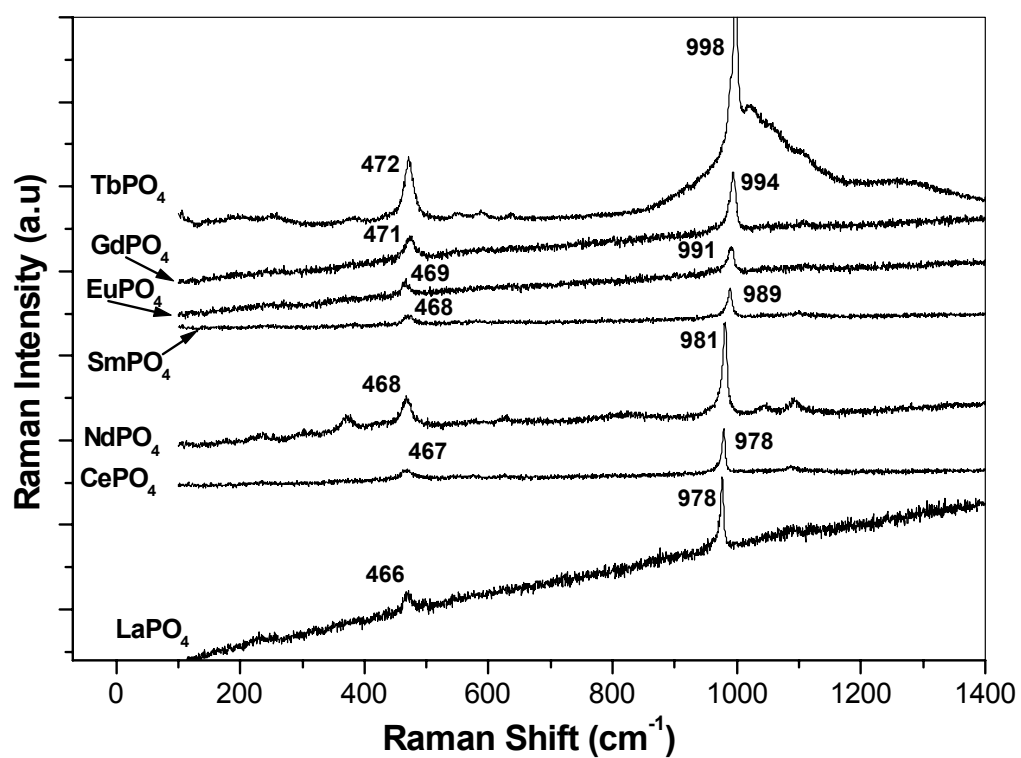


**Fig.S1**

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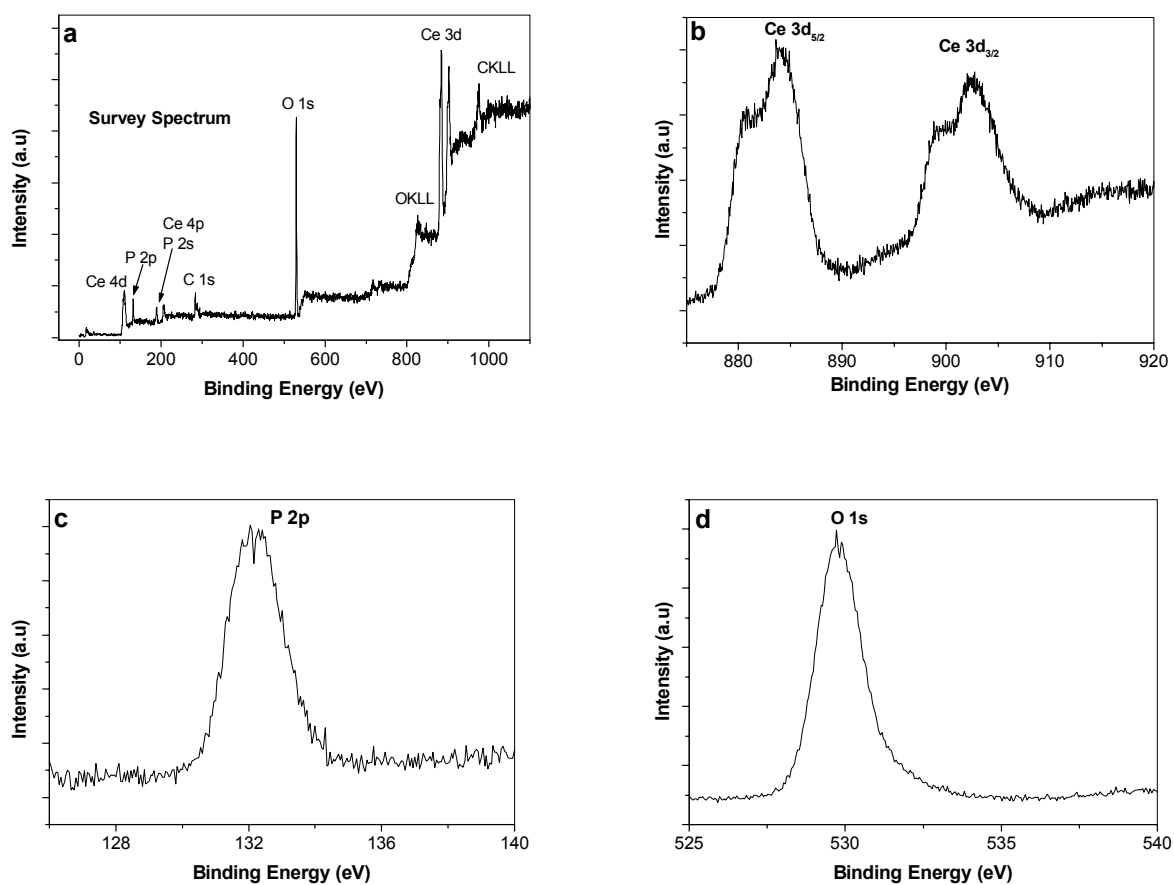


**Fig.S2**



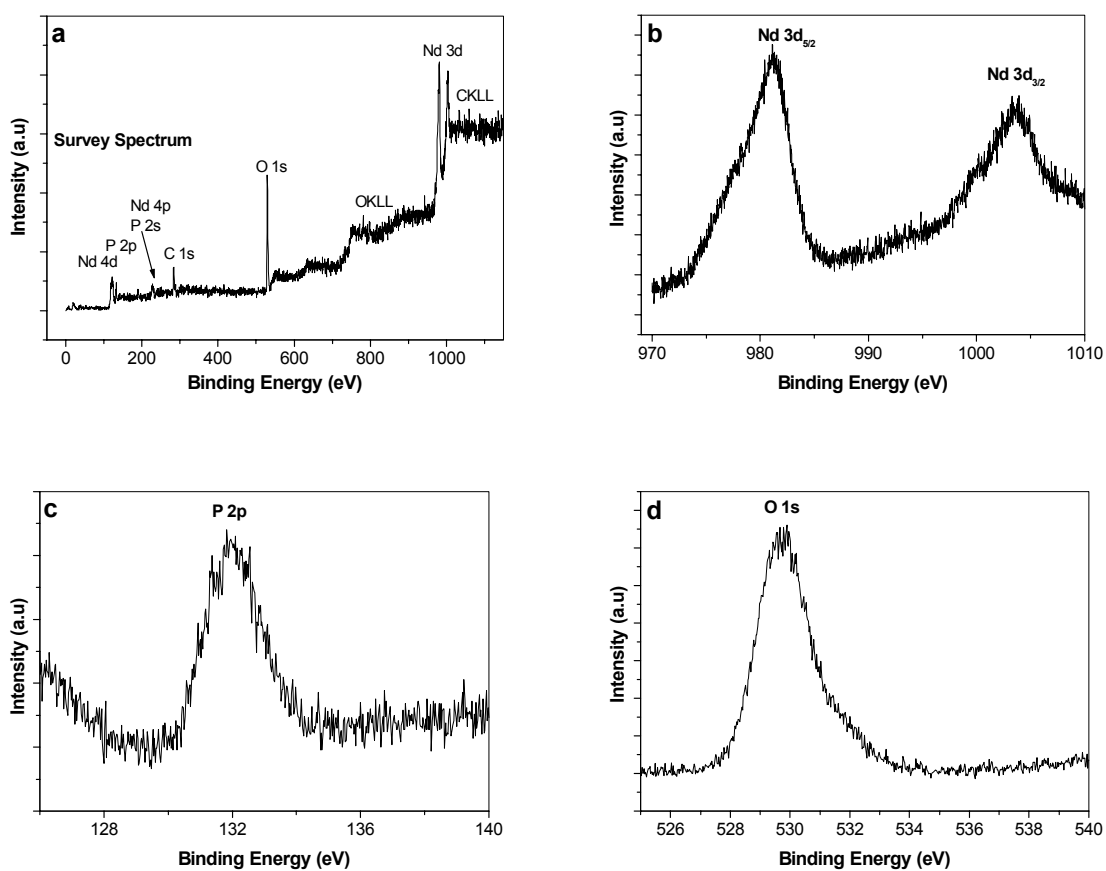
**Fig.S3**

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**Fig.S4**

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**Fig.S5**