# Electronic Supplementary Information (ESI)

# for

## Systematic Transformation of Coordination Polymer Particles to Hollow and Non-Hollow $In_2O_3$ with Pre-Defined Morphology

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**General Methods**

Solvents and all other chemicals were obtained from commercial sources and used as received unless otherwise noted. All scanning electron microscopy (SEM) images and energy dispersive X-ray (EDX) spectra were obtained using either a Hitachi S-4300 field-emission SEM equipped with a Horiba EMAX 6853-H EDS system (Center for Microcrystal Assembly, Sogang University) or a JEOL JSM-6500F field-emission SEM equipped with a JEOL EX-23000 BU EDS system (Yonsei Nanomedical National Core Research Center). All transmission electron microscopy (TEM) images and electron diffraction patterns were obtained using a JEOL JEM-2100F (Center for Microcrystal Assembly, Sogang University). X-ray diffraction studies were conducted using a Rigaku D/MAX-RB equipped with a graphite-monochromated Cu Kα radiation source (40 kV, 120 mA). Photoluminescence measurements were performed using an excitation wavelength of 280 nm at room temperature on a Jasco FP-6500 spectrofluorometer. TGA measurements were carried out using a Shimadzu TGA-50 in a nitrogen atmosphere at a heating rate of 5°C/min in the temperature range of 25-400°C, and 1°C/min in the temperature range of 400-850°C for CPP-3. For CPP-6, the heating rates were 5°C/min and 1°C/min in the temperature range of 25-200°C and 200-850°C, respectivly. Nitrogen sorption isotherm at 77K was measured in the gaseous state using BELSORP II-mini volumetric adsorption equipment. The gas sorption isotherm was measured after pre-treatment under a dynamic vacuum. CPP-3, CPP-5, CPP-6, CPP-7, and CPP-8 were prepared according to the literatures.[S1,S2]

*Preparation of Non-hollow hexagonal rod- and disk-shaped $In_2O_3$*: Hexagonal rod- and disk-shaped precursors CPP-3 and CPP-5 were placed in a conventional furnace and calcinated at 550°C. After 45 min, the non-hollow hexagonal rod- and disk-shaped $In_2O_3$ generated were cooled to room temperature.

*Preparation of Hollow elongated hexagon-, ellipsoid-, and rod-shaped $In_2O_3$*: Elongated hexagon-, ellipsoid-, and rod-shaped precursor CPP-6, CPP-7, and CPP-8 were placed in a conventional furnace and calcinated at 700°C. After 45 min, the hollow elongated hexagon-, ellipsoid-, and rod-shaped $In_2O_3$ generated were cooled to room temperature.

References

S1. W. Cho, H. J. Lee and M. Oh, *J. Am. Chem. Soc.*, 2008, **130**, 16943.

S2. H. J. Lee, W. Cho, S. Jung and M. Oh, *Adv. Mater.*, 2009, **21**, 674.

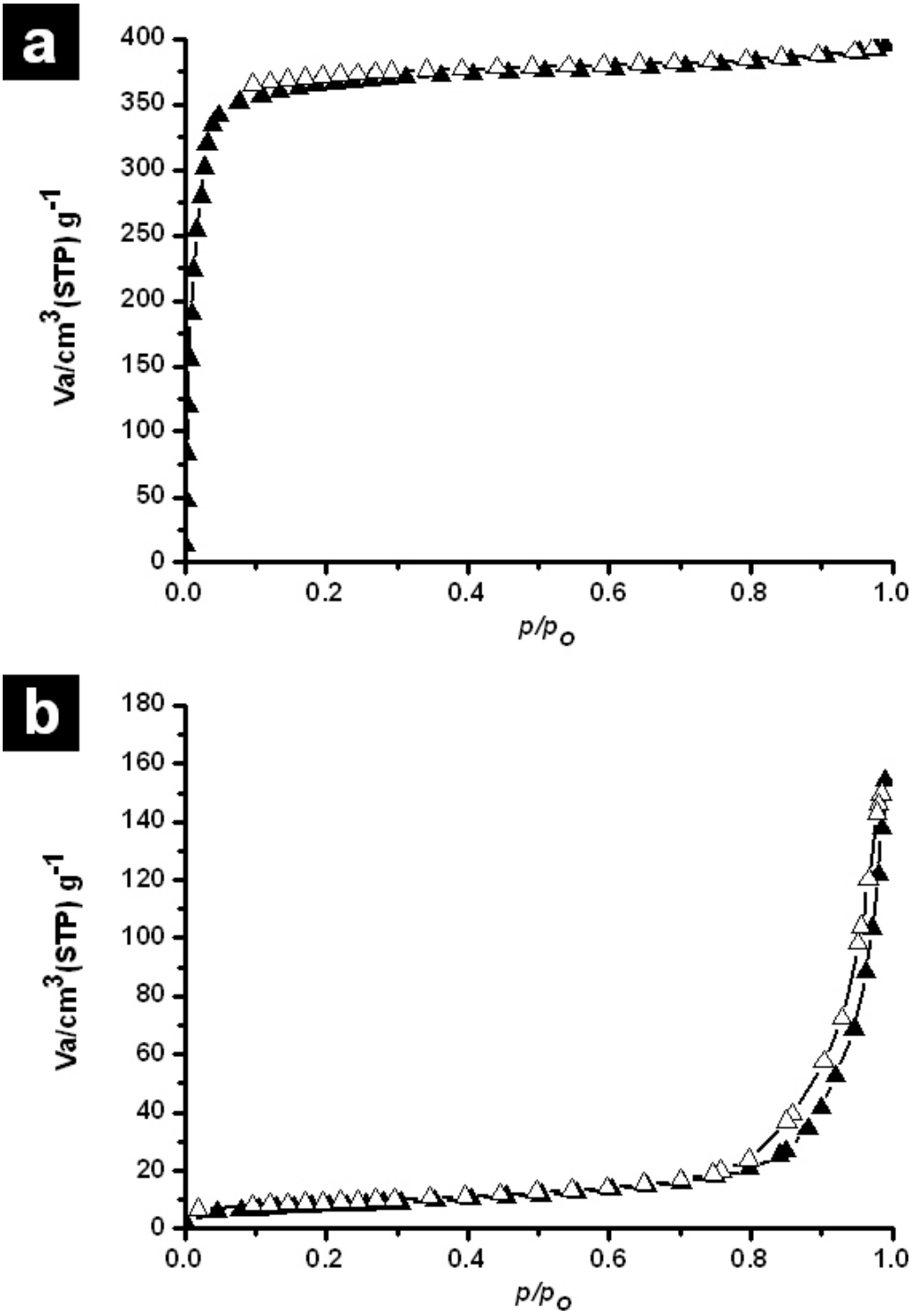


**Fig. S1** Nitrogen sorption isotherms at 77 K for (a) CPP-3 (Ref. S1) and (b) hexagonal rod-shaped $In_2O_3$ (solid triangle, adsorption; open triangle, desorption).

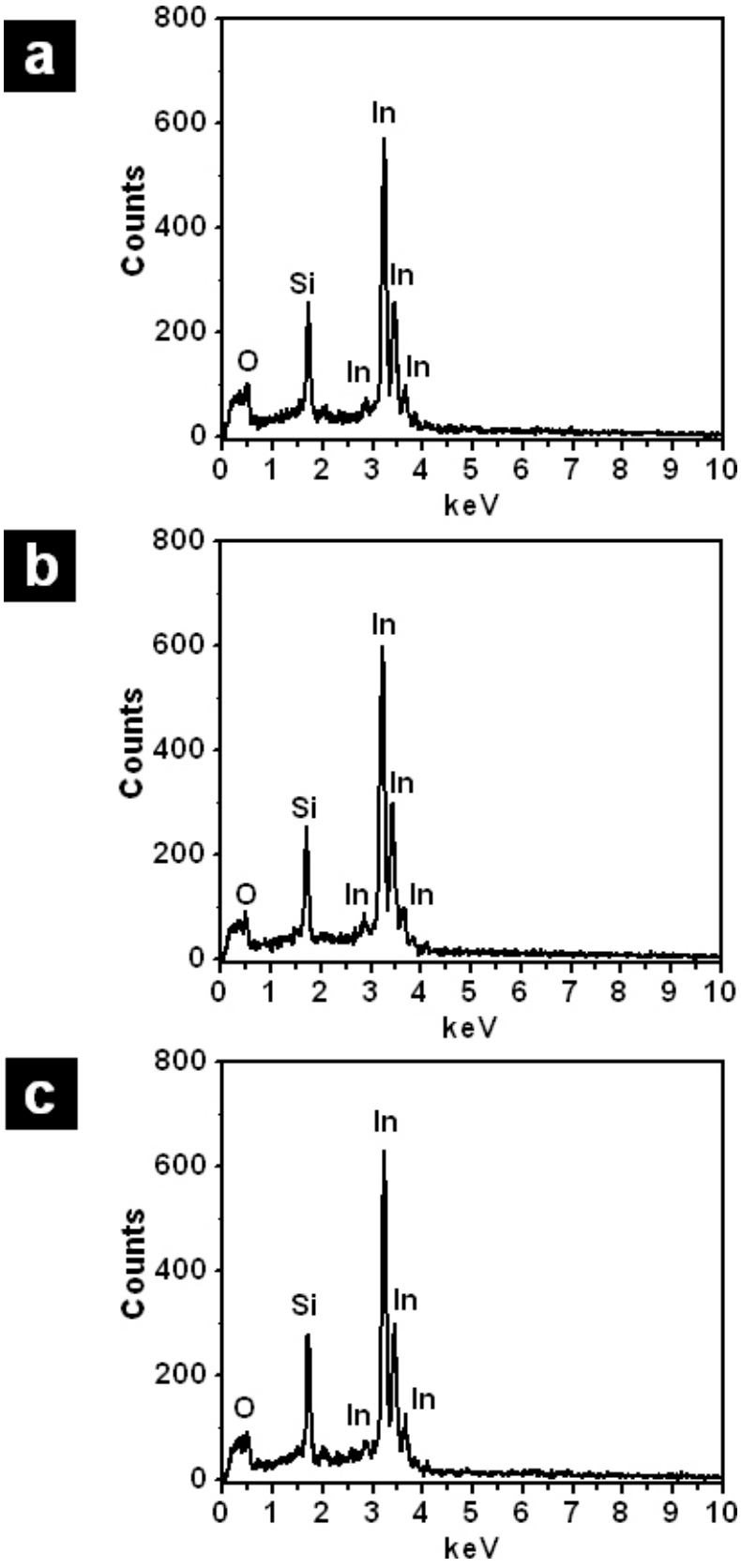


**Fig. S2** EDX spectra of (a) non-hollow hexagonal disk-shaped, (b) hollow ellipsoid-shaped, and (c) hollow rod-shaped $In_2O_3$.

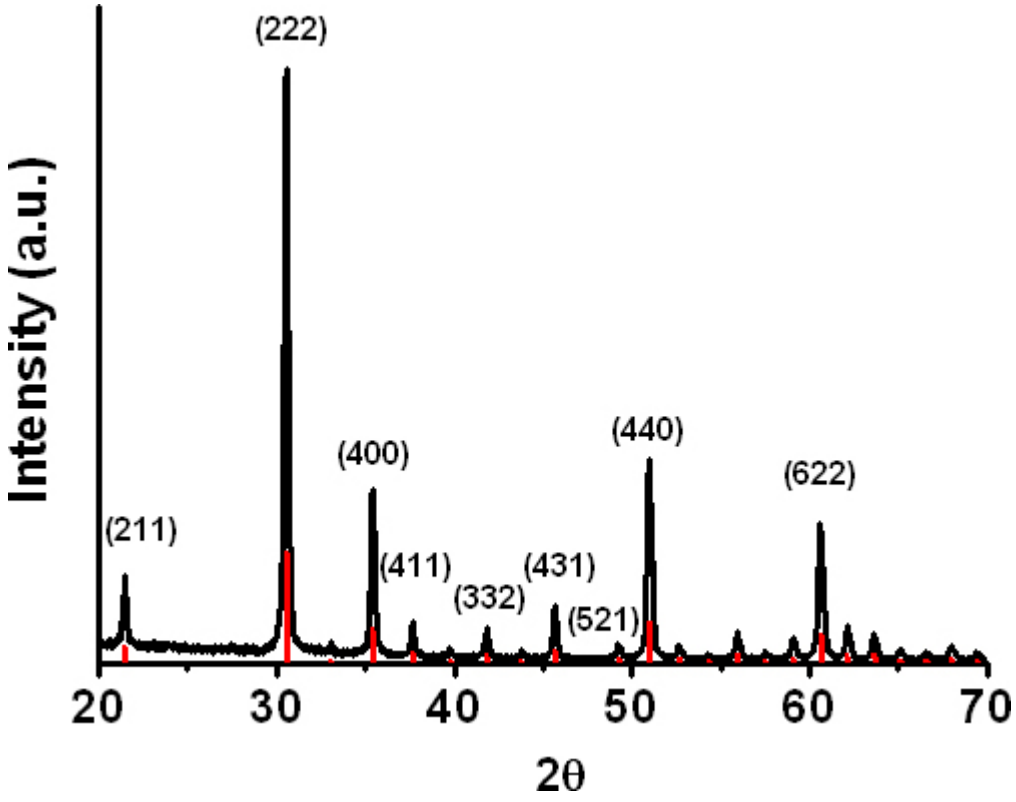


**Fig. S3** PXRD pattern of non-hollow hexagonal disk-shaped $In_2O_3$. Red sticks are the reported values of the cubic phase of $In_2O_3$ (JCPDS Card No. 06-0416).

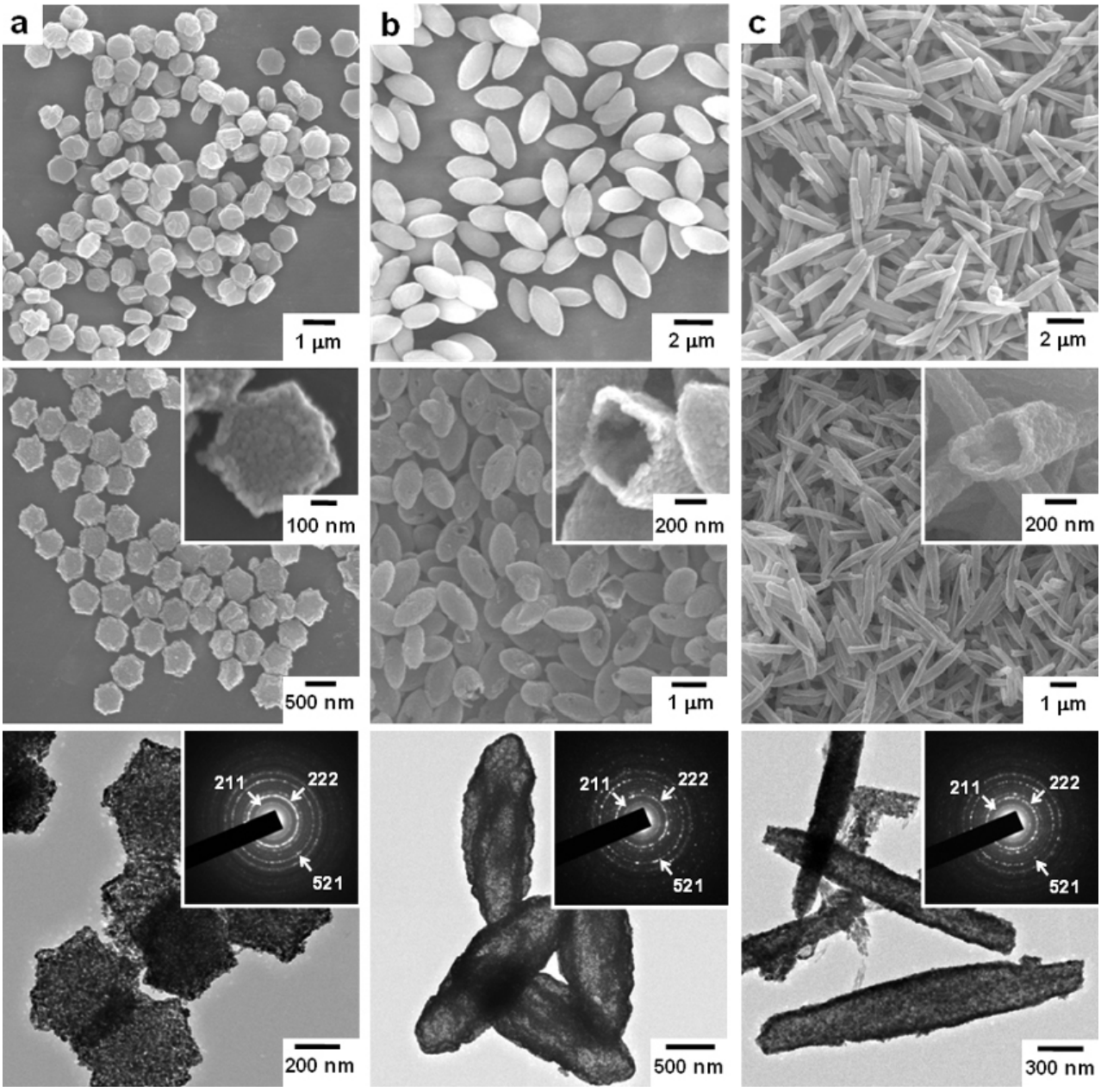


**Fig. S4** (a) Non-hollow hexagonal disk-shaped $In_2O_3$, (b) hollow ellipsoid-shaped $In_2O_3$, and (c) hollow rod-shaped $In_2O_3$. SEM images of the precursor CPPs before calcination (top). SEM (middle) and TEM (bottom) images of the resulting $In_2O_3$ after calcination. Insets are high-magnification SEM images and SAED patterns of the resulting $In_2O_3$. TEM images of ellipsoid- and rod-shaped $In_2O_3$ in (b and c) clearly show the hollow structures.

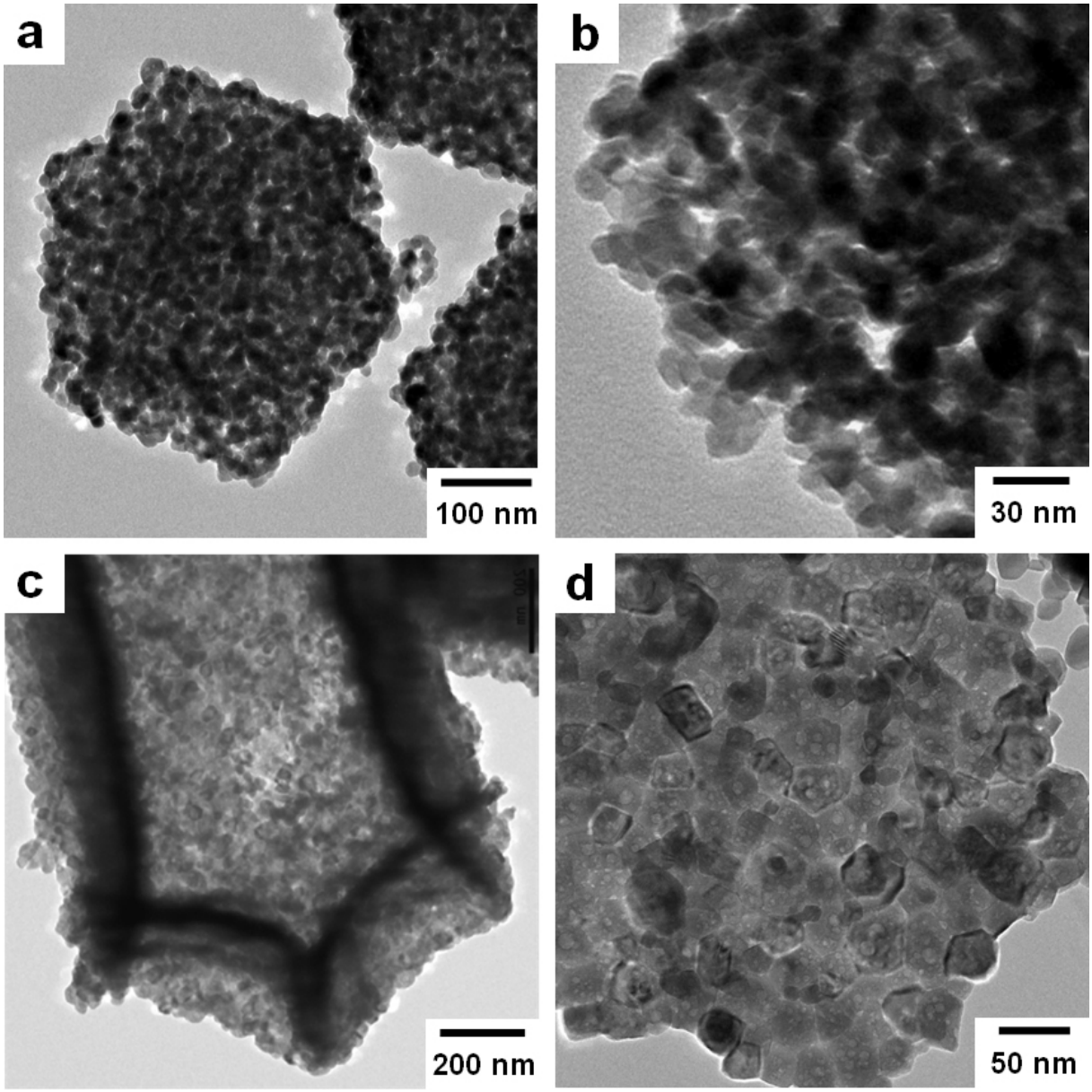


**Fig. S5** High magnification TEM images of (a, b) non-hollow hexagonal disk-shaped and (c, d) hollow elongated hexagon-shaped $In_2O_3$. The TEM images clearly show the polycrystalline structure.

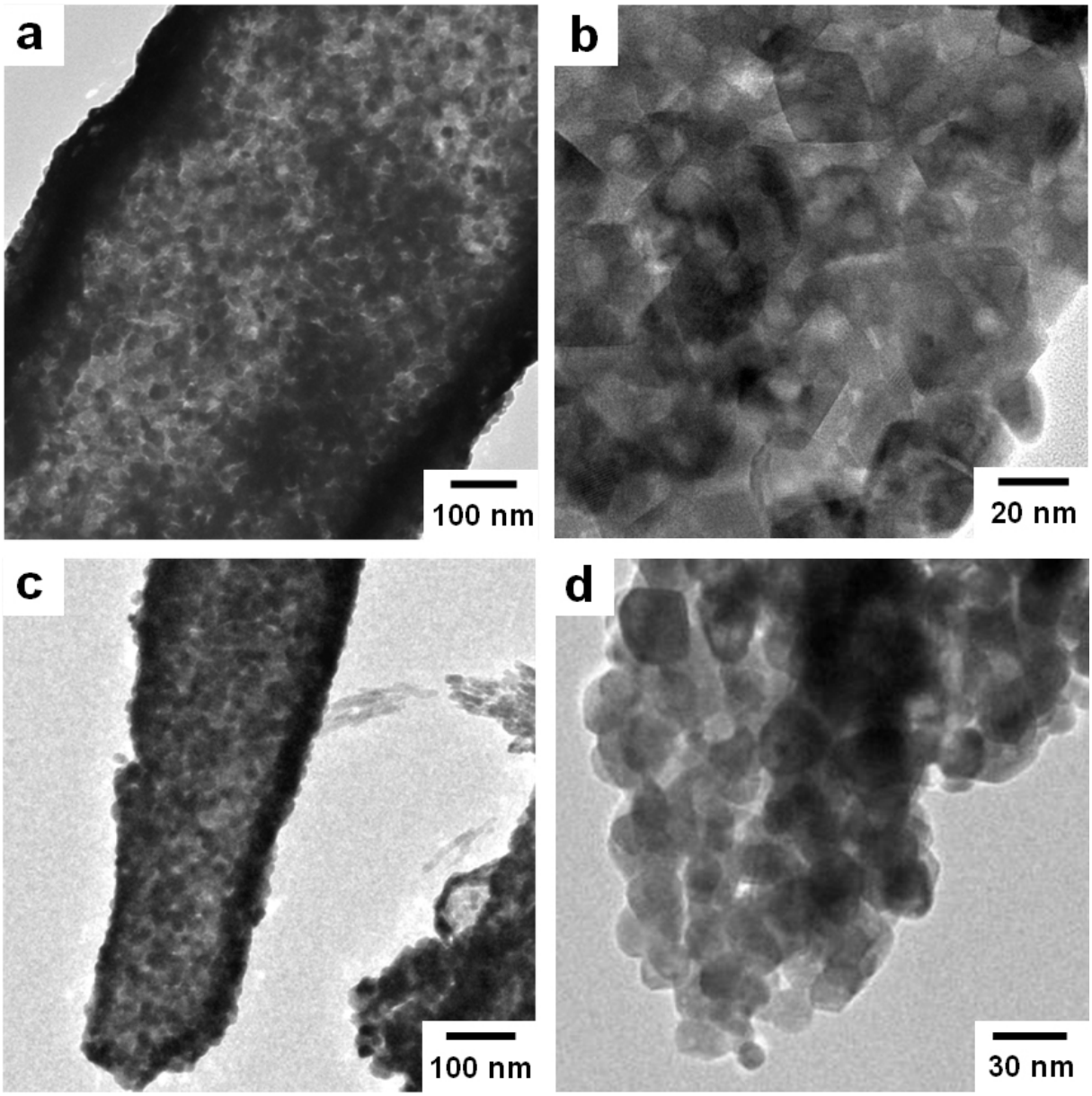


**Fig. S6** High magnification TEM images of (a, b) hollow ellipsoid-shaped and (c, d) hollow rod-shaped $In_2O_3$. The TEM images clearly show the polycrystalline structure.

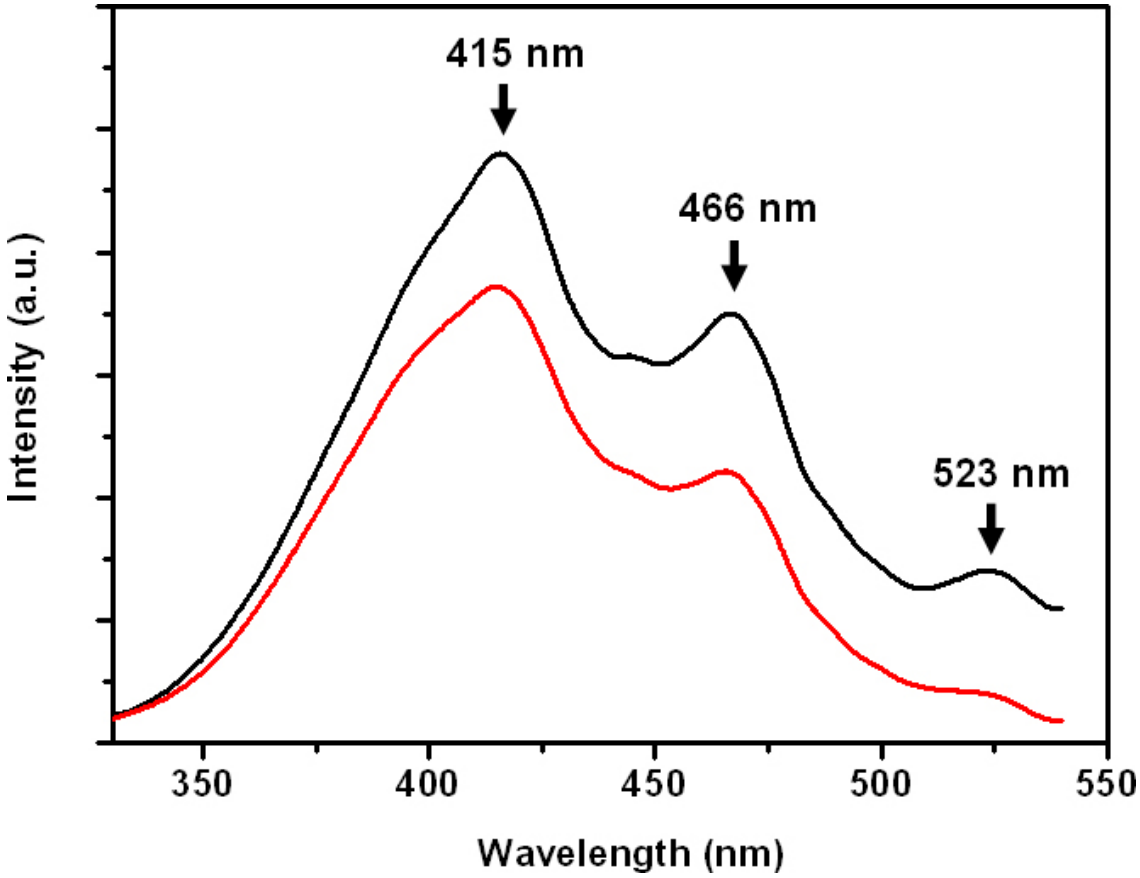


**Fig. S7** PL spectra of non-hollow hexagonal rod-shaped $In_2O_3$ (red) and hollow elongated hexagonal-shaped $In_2O_3$ (black) under excited wavelength of 280 nm at room temperature.