

Supporting Information for Wet Chemical Synthesis and Characterization of Polypodal In₂O₃ Nanoparticles

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Experimental Conditions

Reagents: indium(III) acetate (Strem Chemicals, 99.99%) oleylamine (Aldrich, 80%), oleyl alcohol (Aldrich, 85%), oleic acid (Aldrich, 90%) , and acetic acid (Aldrich, 99.7%), HPLC-grade water (Fisher Scientific) were purchased from and used as received.

Preparation of indium oleate: In the typical synthesis of indium (III) oleate, indium acetate (0.44 g, 151 mmol) and oleic acid were mixed in a 1:3 molar ratio. The mixture was then purged with N₂ three times and heated to 120° until all of the solid dissolved. The flask was placed under vacuum for 30 min to eliminate the acetic acid by-product. The gel thus obtained was dissolved in 10 mL of distilled hexane and the solution was filtered into another flask to remove any remaining unreacted solids. The indium oleate solution was evaporated to dryness leaving behind a clean indium oleate gel.

Preparation of In₂O₃ Nanocrystals: In a typical synthesis of In₂O₃ multibranched particles, 1.5 mmol of In(Oleate)₃ were added into a 100 mL, three-neck flask with condenser, and

dissolved in 4 mL of oleylamine and 64 μL of HPLC H_2O . The reaction mixture was purged three times by vacuum pump thawing techniques. The suspension is then heated to 250 or 360°C for 10 minutes at a heating rate of $\sim 60^\circ\text{C}/\text{min}$. while constantly stirring. During the heating process the solution became dark, a waxy precipitate form, upon drying by precipitation in ethanol and washing with hexane a white to slightly greenish powder was isolated (**1**, prepared at 250 °C; **2** prepared at 360 °C).

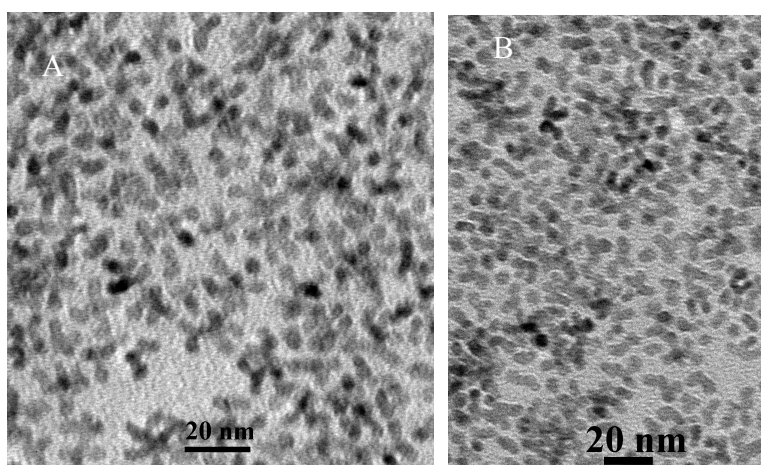


Figure S1: Effect of added water. A. Indium oxides nanoparticles upon decomposing 1.5 mmol Indium (III) oleate, in the presence of traces of H_2O = 64 μL , 10min, $T = 360^\circ\text{C}$. **B.** Upon excluding water the shaping is less preserved and dot shaped particles appear more frequently.

Effect of Time

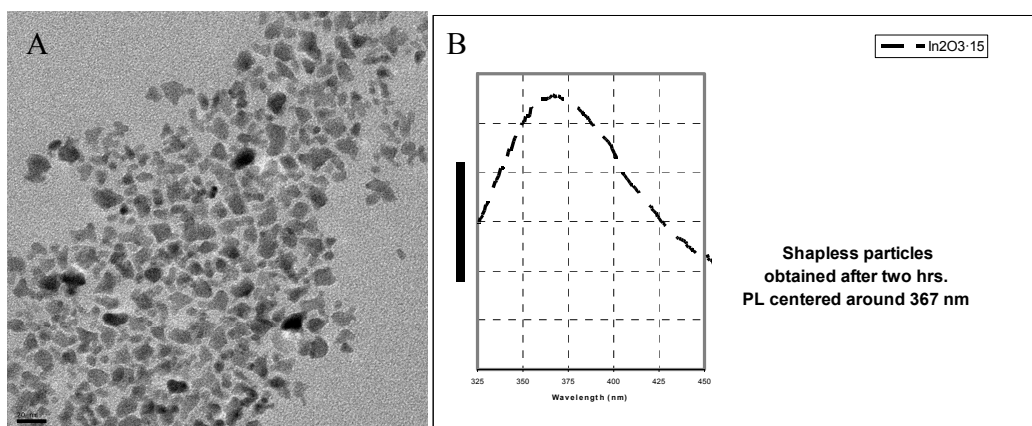


Figure S2. A. Indium oxide shapeless particles synthesized d ~ 10 nm in the standard conditions but the temperature was increased to 360 °C and the time of decomposition increased to two hours. B. PL spectrum, the peak is centered around 367 nm

Effect of other additives

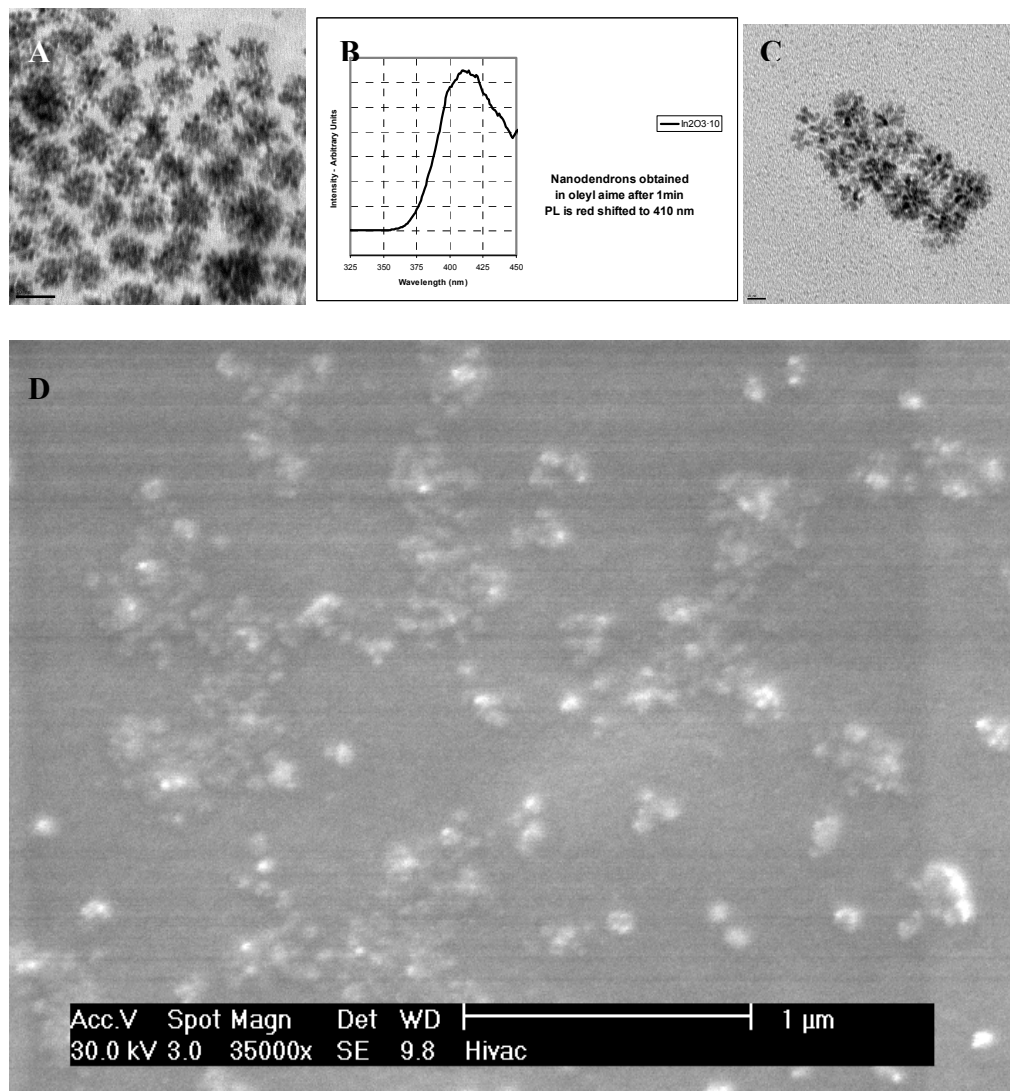


Figure S3. **A.** Indium oxides (In₂O₃) nanodendrons prepared in trioctylamine and oleic acid (<d> ~30 nm) t = 1 min, similar nanodendrons were obtained upon decomposing In(oleate) in 5mL oleylamine T = 220°C t = 1 min (**C**). **B.** PL spectrum. **D.** Indium oxide shapeless particles synthesized in the same conditions but the temperature was increased to 360 °C and the time of decomposition increased to two hours. **C)** ESEM on the nanoflowers. EDAX was also carried out and gave a nominal concentration 65.28% (In) and 34.72%.

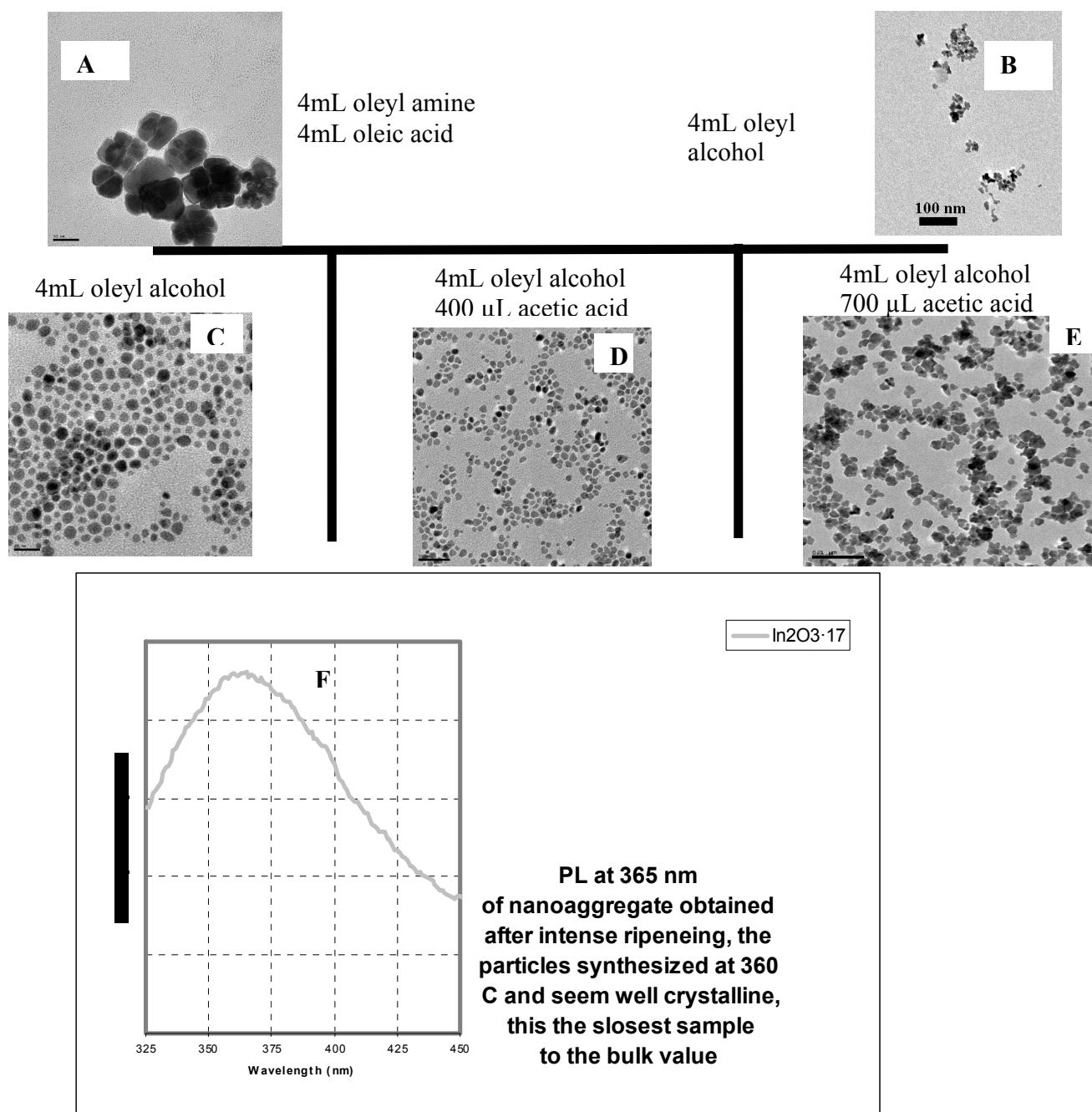


Figure S4. Indium oxide nanoparticles obtained using 1.5 mmol indium (III) oleate, $\text{H}_2\text{O} = 64 \mu\text{L}$, 10 min, $T = 360^\circ\text{C}$ and (A) 4 mL oleyl amine and 4 mL oleic acid, (B) 4 mL of oleyl alcohol, (C) 4 mL oleyl alcohol, (D) 4 mL oleyl alcohol and 400 μL acetic acid and (E) 4 mL oleyl alcohol and 700 μL acetic acid. Traces of acetic acid affect the morphology and accentuate the dissolution and re-growth phenomena. At higher concentrations of acid the particles appear shapeless. When traces of acetic acid are added the shape transforms gradually from spherical to ellipsoidal to shapeless. F. Photoluminescence spectrum of nanocrystals presented in A.

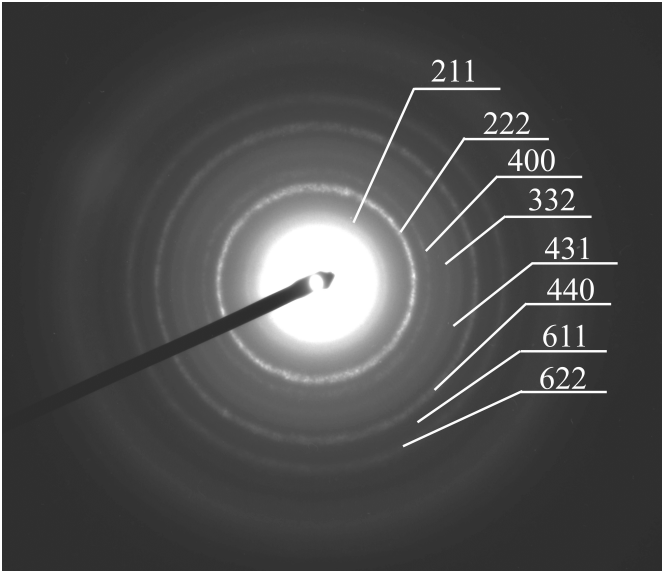


Figure S5. Polycrystalline SAED pattern for **3**.