

# Synthesis of InP Nanocrystal Quantum Dots Using P(SiMe<sub>2</sub>tbu)<sub>3</sub>

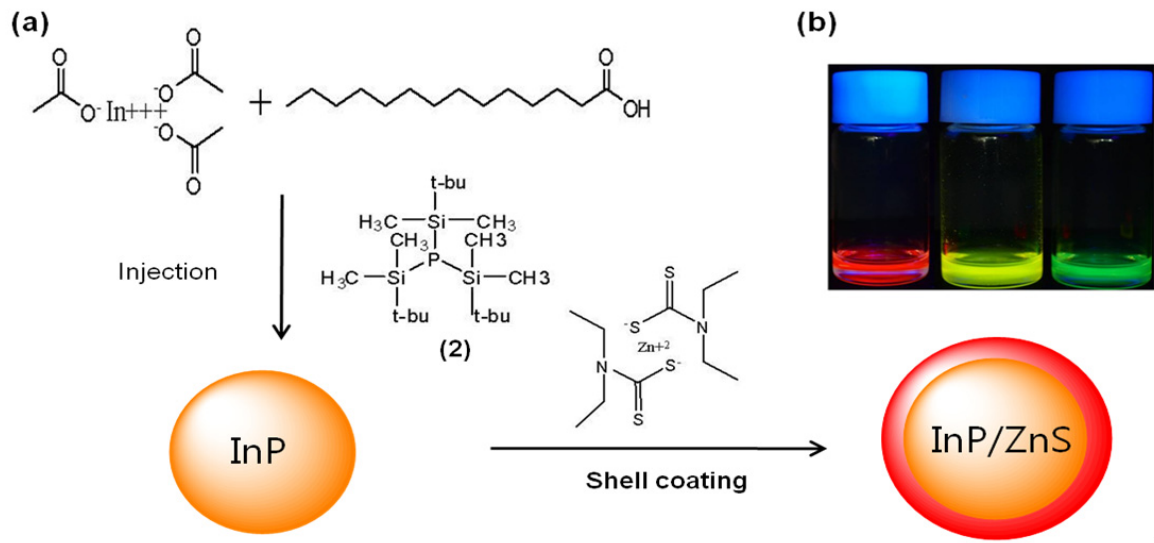
정소명<sup>1</sup>, 김영조<sup>2</sup>, 정소희<sup>1</sup>

<sup>1</sup>Nanomechanical Systems Research Division, Korea Institute of Machinery and Materials,

<sup>2</sup>Department of Chemistry, Chungbuk National University, Chungbuk

Colloidal III-V semiconductor nanocrystal quantum dots (NQDs) have attracted attention as they can be applied in various areas such as LED, solar cell, biological imaging, and so on because they have decreased ionic lattices, larger exciton diameter, and reduced toxicity compared with II-VI compounds. However, the study and application of III-V semiconductor nanocrystals is limited by difficulties in control nucleation because the molecular bonds in III-V semiconductors are highly covalent compared to II-VI compounds. There is a need for a method that provides rapid and scalable production of highly quality nanoparticles. We present a new synthetic scheme for the preparation of InP nanocrystal quantum dots using new phosphorus precursor, P(SiMe<sub>2</sub>tbu)<sub>3</sub>. InP nanocrystals from 530nm to 600nm have been synthesized via the reaction of In(Ac)<sub>3</sub> and new phosphorus precursor in noncoordinating solvent, ODE. This opens the way for the large-scale production of high quality Cd-free nanocrystal quantum dots.

**Keywords:** Quantum dot, InP nanocrystal, New phosphorus precursor



**Fig. 1.** (a) One-pot synthesis of InP with P(SiMe<sub>2</sub>-tert-Bu)<sub>3</sub> followed by ZnS shell over-coating  
 (b) Size-tunable emission from InP/ZnS NQDs synthesized using new P precursor (red-green).