Supplementary Information

Heterostructure Seed-Mediated Synthesis of Zn_3P_2 Quantum Dots for Bright Band-Edge Emission

*Ju ho Kim†, Hyekyeong Kwon†, Myoungho Jeong‡, and Jiwon Bang†**

† Department of chemistry, Incheon National University Yeonsu-gu, Incheon 22012, Republic of Korea

‡ Samsung Future Technology Campus, 130 Samsung-ro, Yeongtong-gu, Suwon, Korea

Republic

Corresponding Author

* E-mail: jwbang@inu.ac.kr

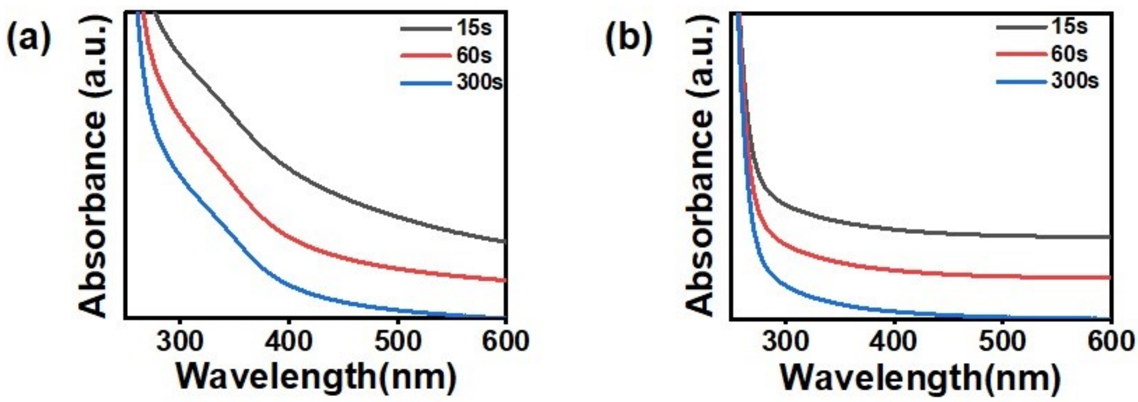

Figure S1. UV–vis absorption spectra of the reaction solution over time at 270 °C, showing the spectral evolution for (a) solution containing In and P precursors and (b) solution containing Zn and P precursors. The precursor concentrations of the reaction vessels are identical to those used for the synthesis of In(Zn)P-Zn_3P_2 QDs, as described in the experimental section of the main text.

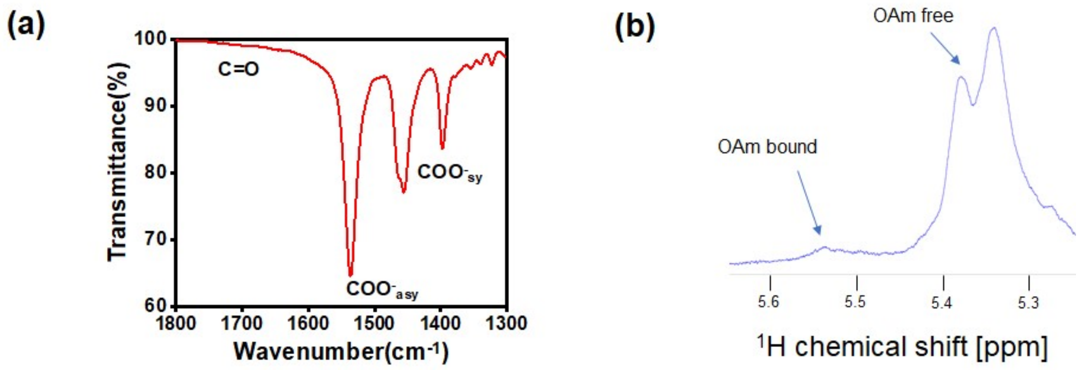

Figure S2. (a) FTIR spectra and (b) vinyl region of the ^{1}H NMR spectra of the 18-month-aged In(Zn)P-Zn_3P_2 QDs.

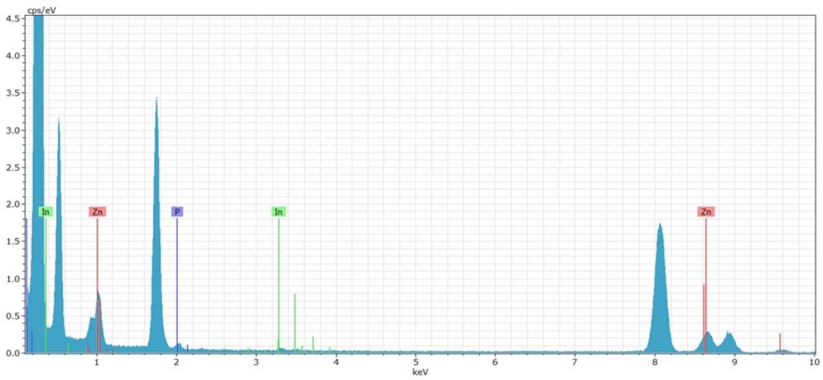

Figure S3. EDS profile of the In(Zn)P-Zn_3P_2 QDs.

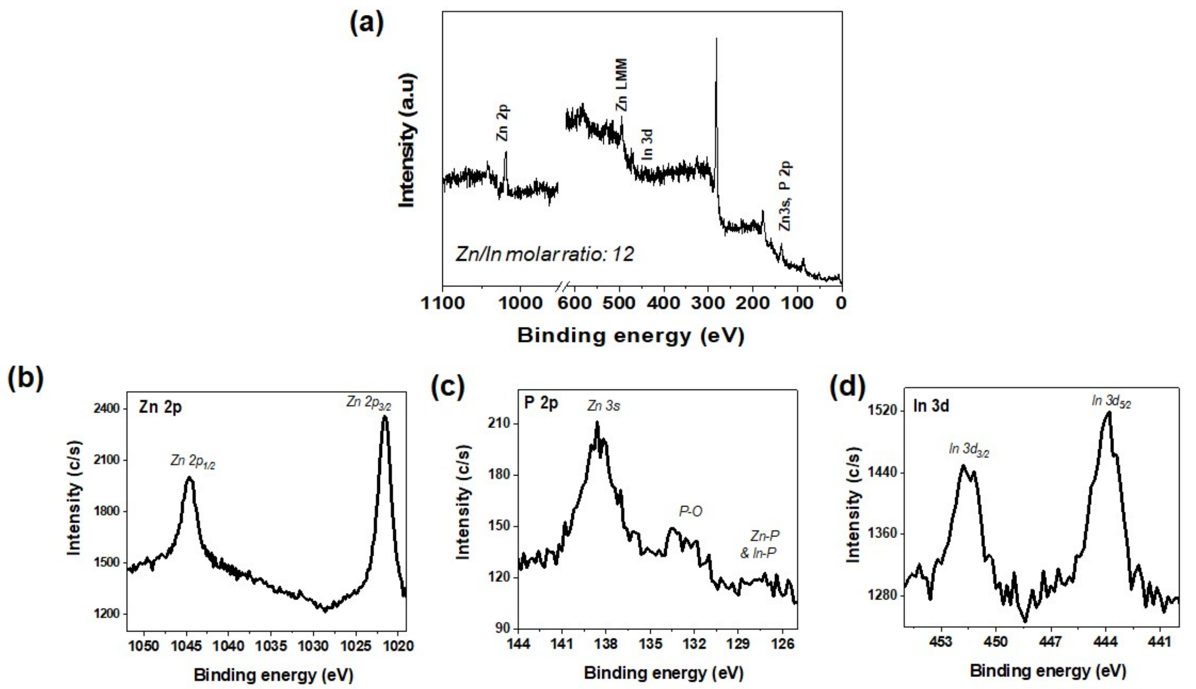

Figure S4. (a) XPS survey spectrum and (b–d) high-resolution XPS spectra of the In(Zn)P-Zn_3P_2 QDs.

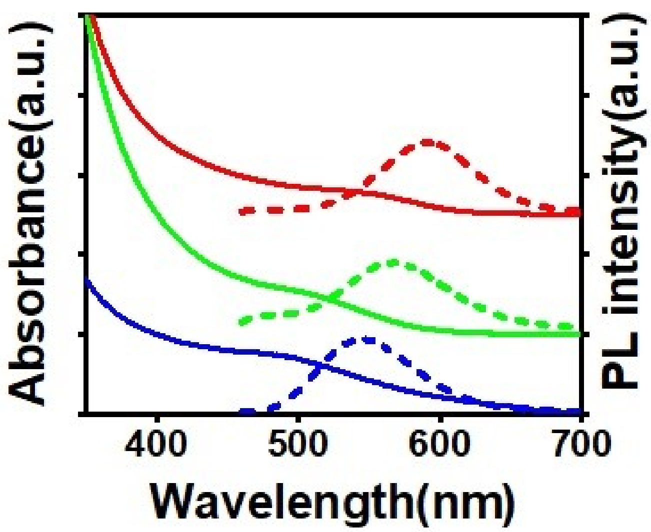

Figure S5. Absorption (solid lines) and corresponding PL emission spectra (dashed lines) for a series of In(Zn)P-Zn_3P_2 QDs with ZnS shell coatings derived from different batches of In(Zn)P-Zn_3P_2 core QD samples.

Table S1. Room-temperature bi-exponential PL decay fitting parameters of the PL decay spectra for the In(Zn)P-Zn_3P_2 and In(Zn)P-Zn_3P_2/ZnS core/shell QD samples, as presented in Figure 5c.

Sample	A_1 (%)	τ_1 (ns)	A_2(%)	τ_2 (ns)	τ_{ave} (ns)
In(Zn)P-Zn_3P_2	**56.5**	**11.1**	**43.4**	**72.1**	**61.9**
In(Zn)P-Zn_3P_2/ZnS	**48.1**	**12.5**	**51.9**	**82.9**	**74.3**

$$I_t = A_1 e^{-(t/\tau_1)} + A_2 e^{-(t/\tau_2)}$$

$$\tau_{ave} = \frac{(A_1\tau_1^2 + A_2\tau_2^2)}{(A_1\tau_1 + A_2\tau_2)}$$