Electronic Supplementary Information

InP/ZnSe/ZnS Quantum Dots with Strong Dual Emissions: Visible Excitonic Emission & Near-Infrared Surface Defect Emission and Their Application in In Vitro and In Vivo Bioimaging†

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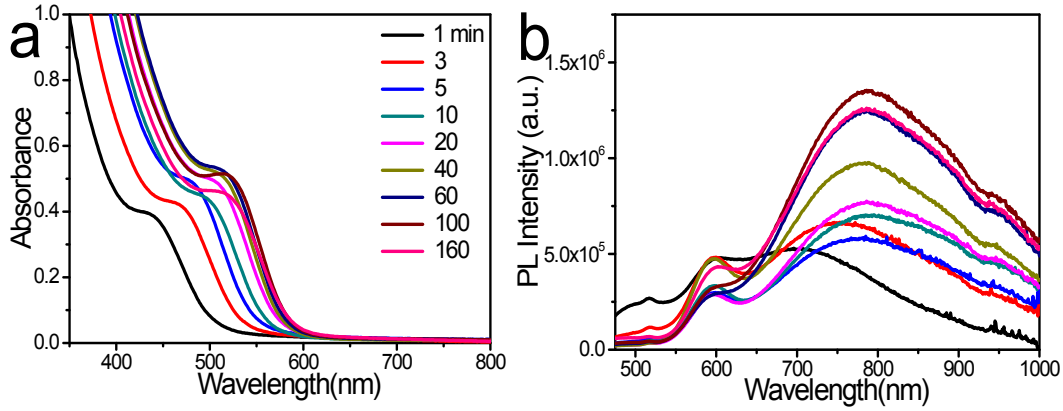

Figure S1. (a) UV–vis absorption and (b) PL spectra of InP core QDs taken at various reaction time at 180 ºC.

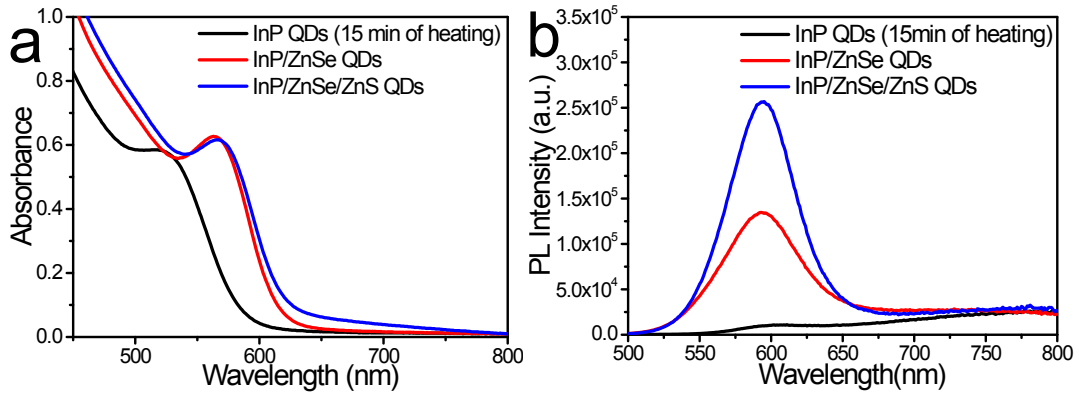

Figure S2. (a) Absorption and (b) PL spectra of InP core QDs, InP/ZnSe QDs and InP/ZnSe/ZnS QDs. The heating time of InP core QDs is 15 min.

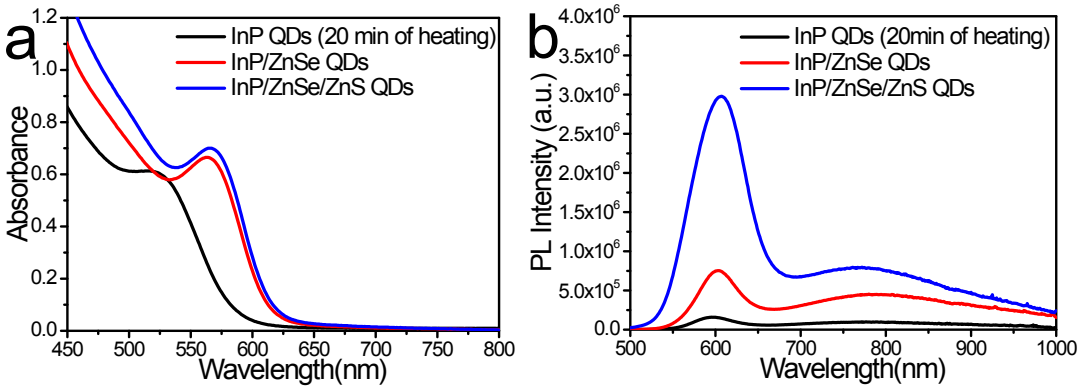

Figure S3. (a) Absorption and (b) PL spectra of InP core QDs, InP/ZnSe QDs and InP/ZnSe/ZnS QDs. The heating time of InP core QDs is 20 min.

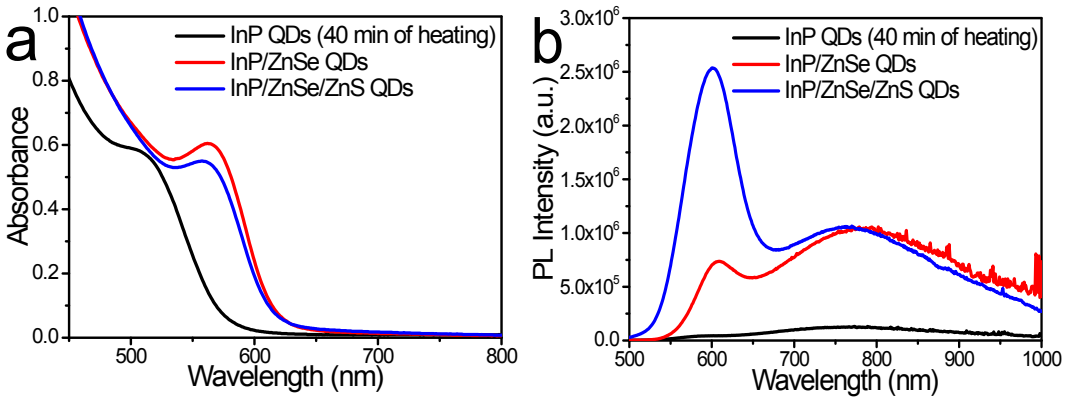

Figure S4. (a) Absorption and (b) PL spectra of InP core QDs, InP/ZnSe QDs and InP/ZnSe/ZnS QDs. The heating time of InP core QDs is 40 min.

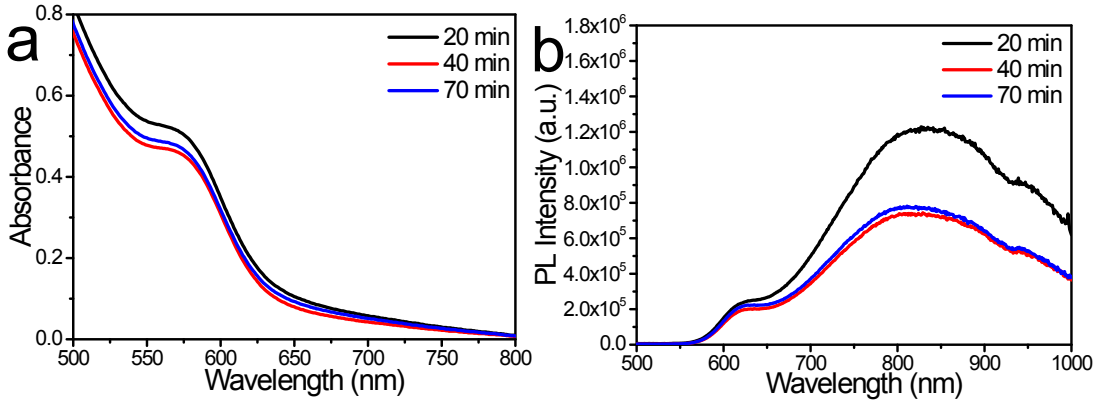

Figure S5. (a) Absorption and (b) PL spectra of InP core QDs and InP/ZnSe QDs with different heating time for ZnSe shell growth.

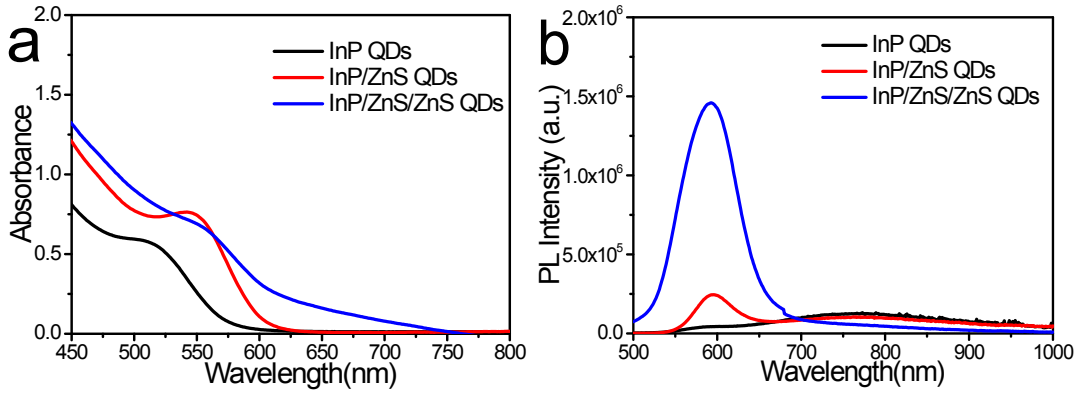

Figure S6. (a) Absorption and (b) PL spectra of InP core QDs, InP/ZnS QDs and InP/ZnS/ZnS QDs. The heating times for the first ZnS shell and the second ZnS shell were 30 min.

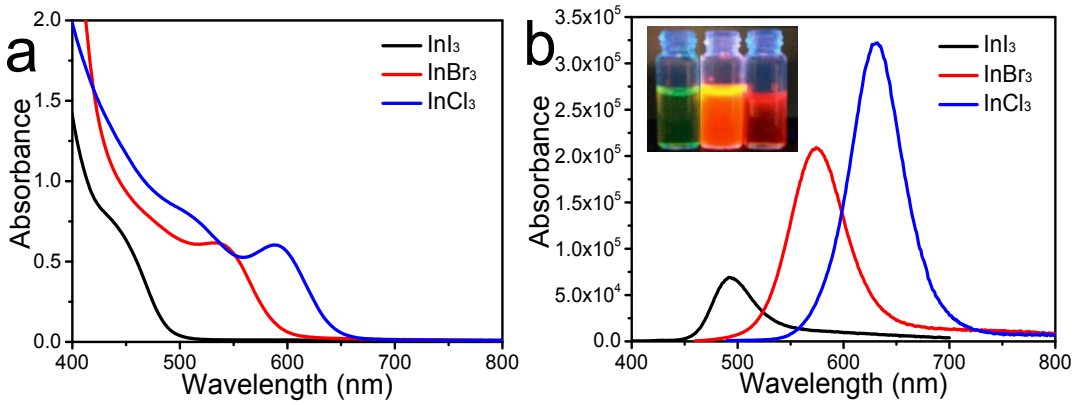

Figure S7. Absorption and PL spectra of InP/ZnSe/ZnS QDs with strong excitonic emission and negligible surface defect emission synthesized by using InP QDs with short heating time as the cores, in which the band-to-band emission could be tuned from green to red by changing In precursor (namely, $InCl_3$ for red emission, $InBr_3$ for orange emission and InI_3 for green emission), similar to previous reports.[1,2]

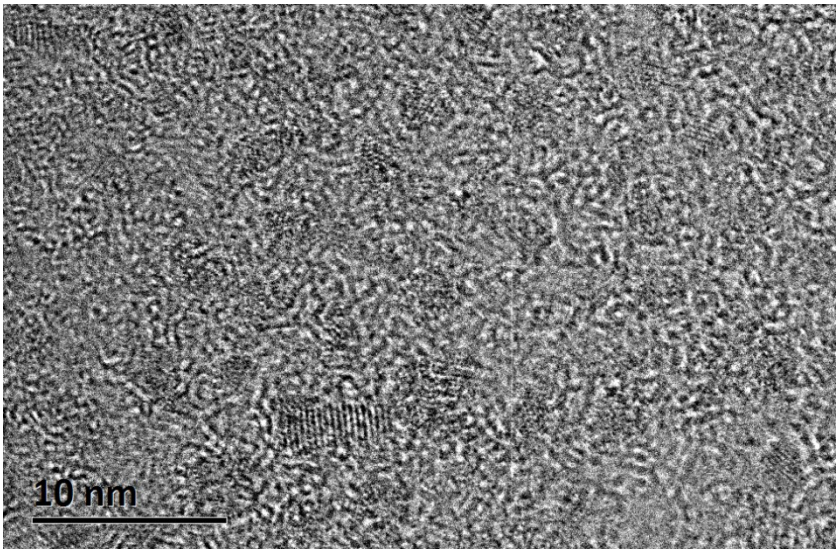

Figure S8. HR-TEM image of InP core QDs (60 min of heating).

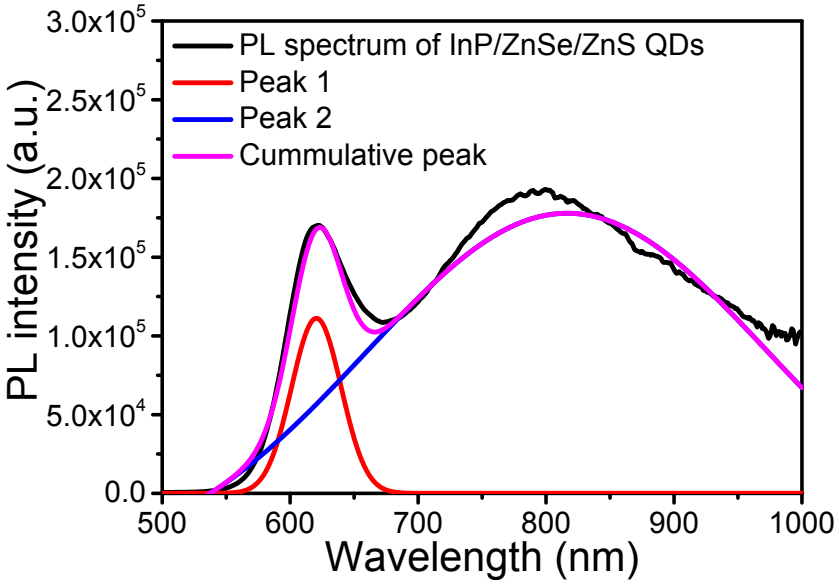

Figure S9. Multi-peak fitting of the PL spectrum of the dual emissive InP/ZnSe/ZnS QDs.

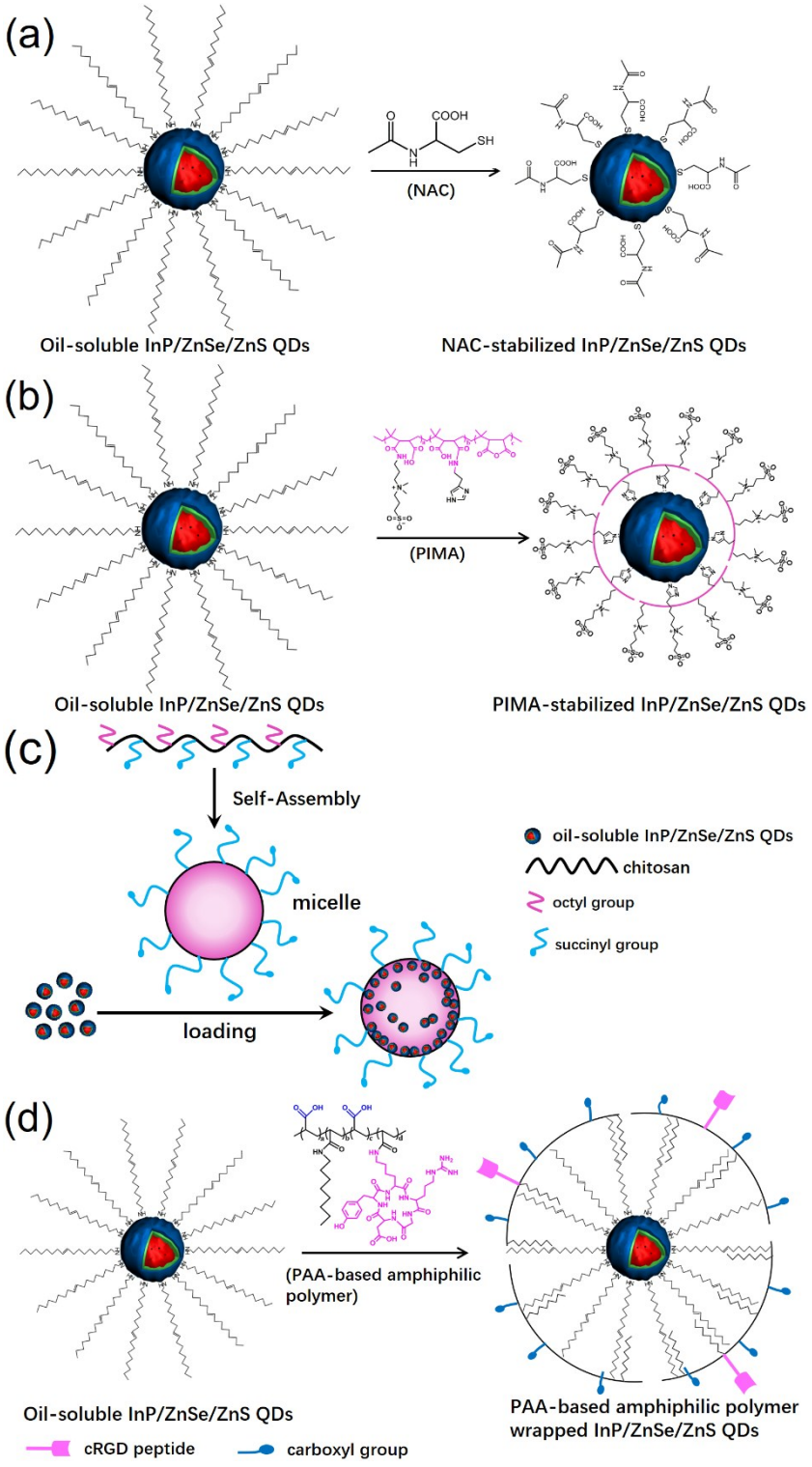

Figure S10. Schematic illustration of the four strategies used for water transfer: replacing the original oil-soluble ligands using (a) NAC or (b) SPH, (c) encapsulating the oil-soluble QDs using chitosan-based micelles, (d) wrapping the oil-soluble QDs using PAA-based amphiphilic polymer.

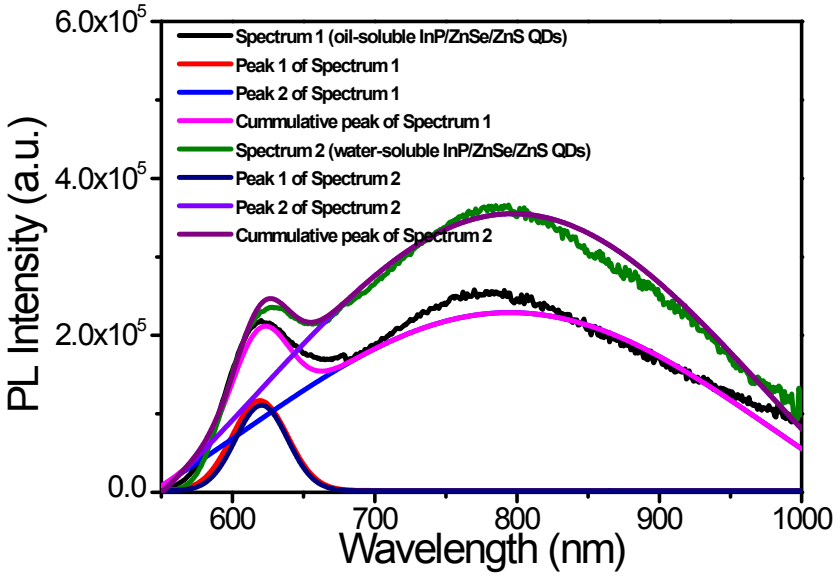

Figure S11. Multi-peak fittings of the PL spectra of initial oil-soluble InP/ZnSe/ZnS QDs and resultant water-soluble InP/ZnSe/ZnS QDs wrapped by PAA-based amphiphilic polymers.

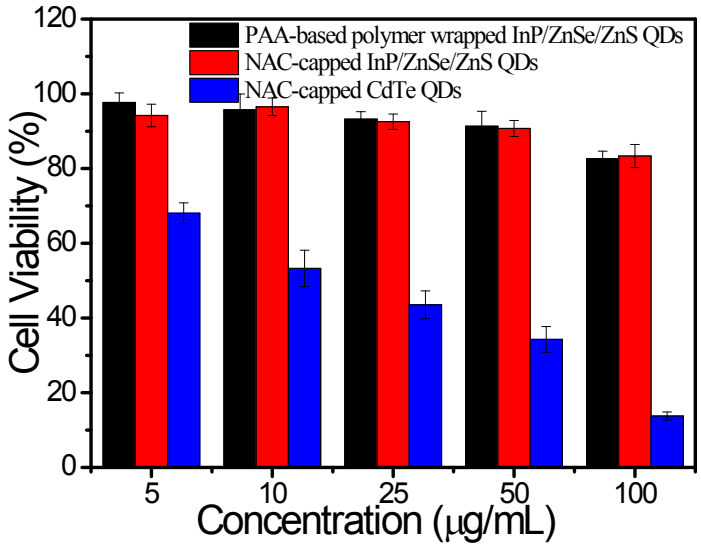

Figure S12. Cytotoxicities of PAA-based polymer wrapped InP/ZnSe/ZnS QDs, NAC-capped InP/ZnSe/ZnS QDs and NAC-capped CdTe QDs on normal human liver cells (L02 cells) were evaluated using MTT assay. The concentrations were the final QD concentrations in cell culture medium.

References

(1) Tessier, M. D.; Dupont, D.; De Nolf, K.; De Roo, J.; Hens, Z. Economic and Size-Tunable Synthesis of InP/ZnE (E = S, Se) Colloidal Quantum Dots. *Chem. Mater.* **2015**, *27*, 4893–4898.

(2) Tessier, M. D.; De Nolf, K.; Dupont, D.; Sinnaeve, D.; De Roo, J.; Hens, Z. Aminophosphines: A Double Role in the Synthesis of Colloidal Indium Phosphide Quantum Dots. *J. Am. Chem. Soc.* **2016**, *138*, 5923–5929.