Supplementary Materials

The critical role of thioacetamide concentration in the formation of ZnO/ZnS heterostructures by sol-gel process

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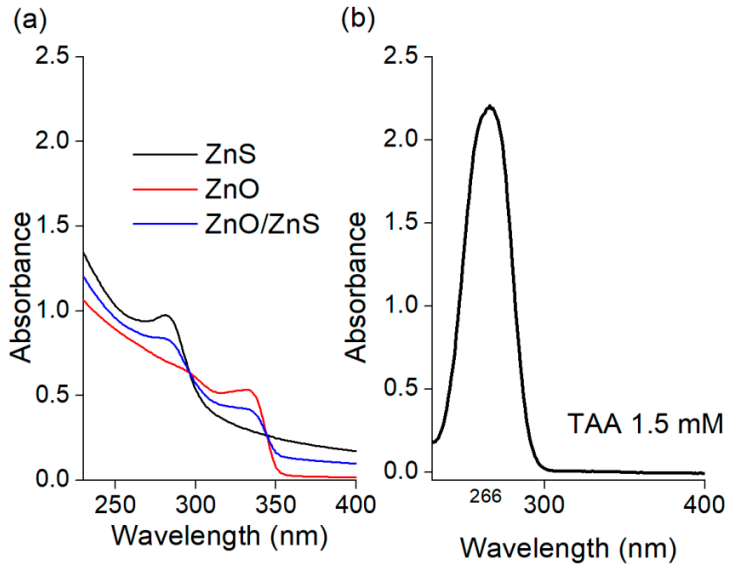

Figure S1. UV-vis spectra of (**a**) ZnO QDs, ZnS QDs and the mixture of ZnO and ZnS QDs as-synthesized colloidal suspensions and (**b**) ethanolic solution of TAA.

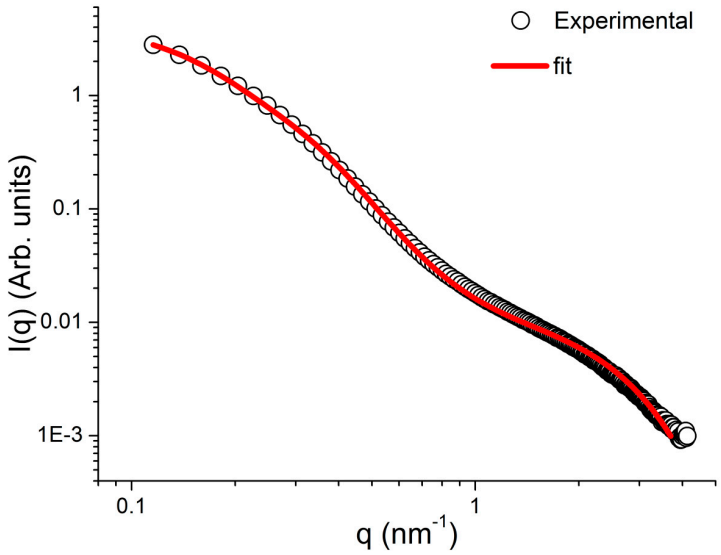

Figure S2. Example of SAXS curve of TAA50 at the end of the reaction (about 36 min) fitted with the form factors of two populations of homogeneous spheres displaying Lognormal radius distribution using SASfit software.

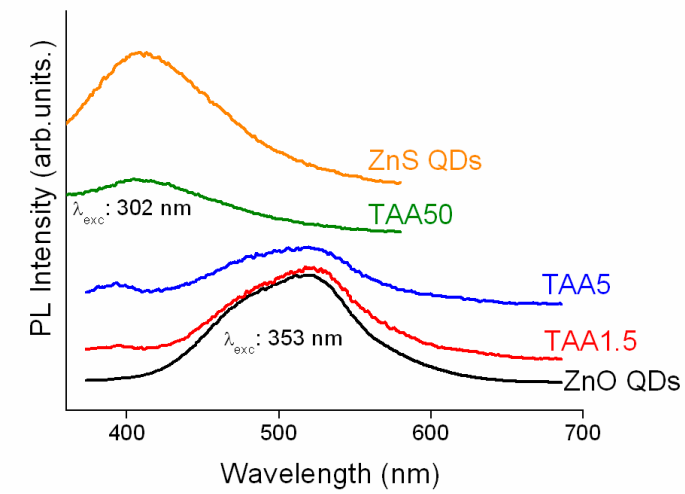

Figure S3. Photoluminescence emission spectra of ZnO QDs, TAA1.5 and TAA5 excited at 353 nm and TAA50 and ZnS QDs excited at 302 nm.

ZnO QDs can present typically two main emission contributions: (i) the exciton emission (photo-generated electrons recombine with the holes in the valence band) in the UV range, and (ii) a broad visible luminescence (originated from defects such as oxygen vacancies) usually around 500 nm. In our study, it was observed a decrease in the visible emission and a weak increase in the UV emssion for the TAA5 compared to TAA1.5 and ZnO QDs. During the sulfidation process, the formation of a discontinuous shell, likely made of small ZnS nanocrystallites, may give rise to the decrease in oxygen vacancies on ZnO QDs surface, resulting in the decrease in visible emission. The small increase in UV emission can be explained by the deposition of a higher bandgap discontinuous shell on the lower bandgap core, which passivates the surface of the ZnO core [1–4].

References

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