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# Tunable emission properties of core-shell ZnCuInS-ZnS quantum dots with enhanced fluorescence intensity

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Cadmium-free I-III-VI quantum dots (QDs), represented by Cu-In-S (CIS), are widely investigated for their non-toxicity and tunable emission properties. In this work, Zn-Cu-In-S (ZCIS) alloyed QDs were synthesized via a solvothermal approach by heating up a mixture of the corresponding metal precursors and sulphur powder with dodecanethiol in oleylamine media, and the fluorescent intensity was greatly enhanced by coating ZnS (ZS) shell. By changing the ratio of Cu, the as prepared ZCIS-ZS QDs showed composition-tunable photoluminescent (PL) emission over the visible spectral window from about 500 nm to 620 nm, which is much wider than that of CIS QDs. Moreover, the influence of excitation wavelength, reaction temperature and time on the optical properties of the ZCIS-ZS QDs was also studied. This research provides a feasible and simple approach to prepare ZCIS-ZS QDs with large tunable spectral range on visible region, which could greatly contribute to the development of potential applications due to their non-toxicity and excellent optical properties.

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