Electronic Supplementary Material (ESI) for CrystEngComm
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Supporting Information

Compositionally Tunable $Cu_2Sn(S_xSe_{1-x})_3$ Nanocrystals: Facile Direct Solution-phase Synthesis, Characterization, and Scalable Procedure

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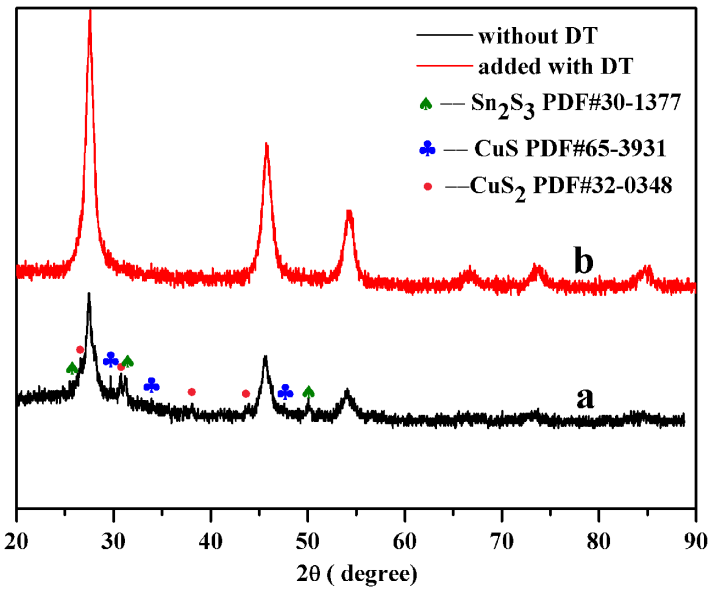

Figure S1. XRD patterns of $Cu_2Sn(S_xSe_{1-x})_3$ NCs (x=0.3) reacted in (a) pure OAm solution (b) OAm solution with 1 mL DDT.

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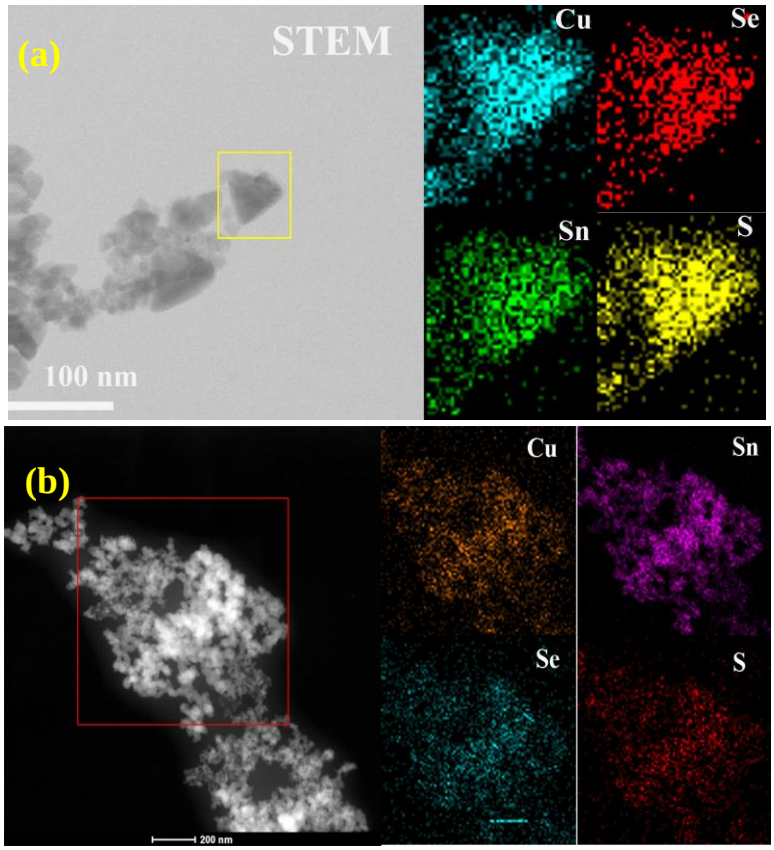

Figure S2. STEM image of (a) $Cu_2Sn(S_{0.7}Se_{0.3})_3$ and (b) $Cu_2Sn(S_{0.5}Se_{0.5})_3$ nanocrystals.

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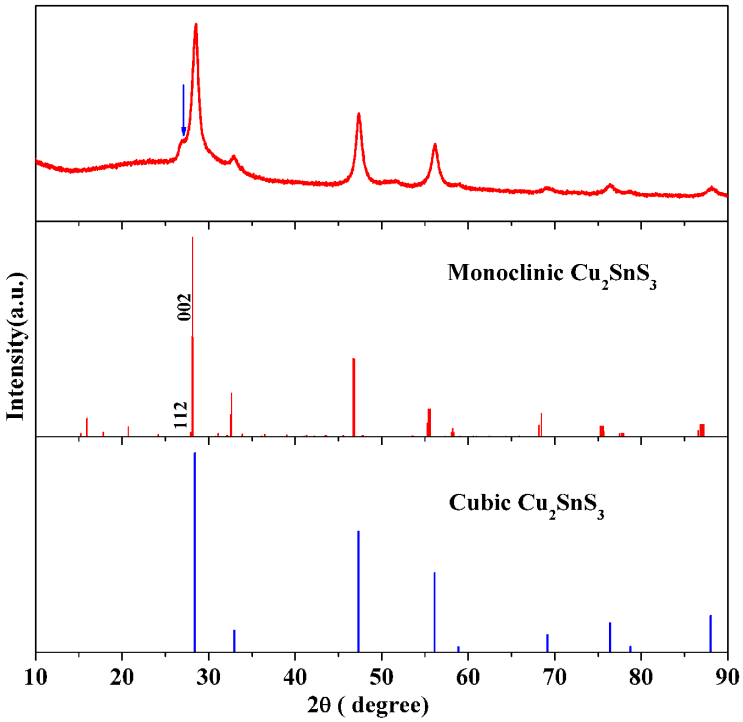

Figure S3. XRD pattern of the as-prepared Cu_2SnS_3 NCs and simulated XRD pattern of monoclinic and cubic structures.

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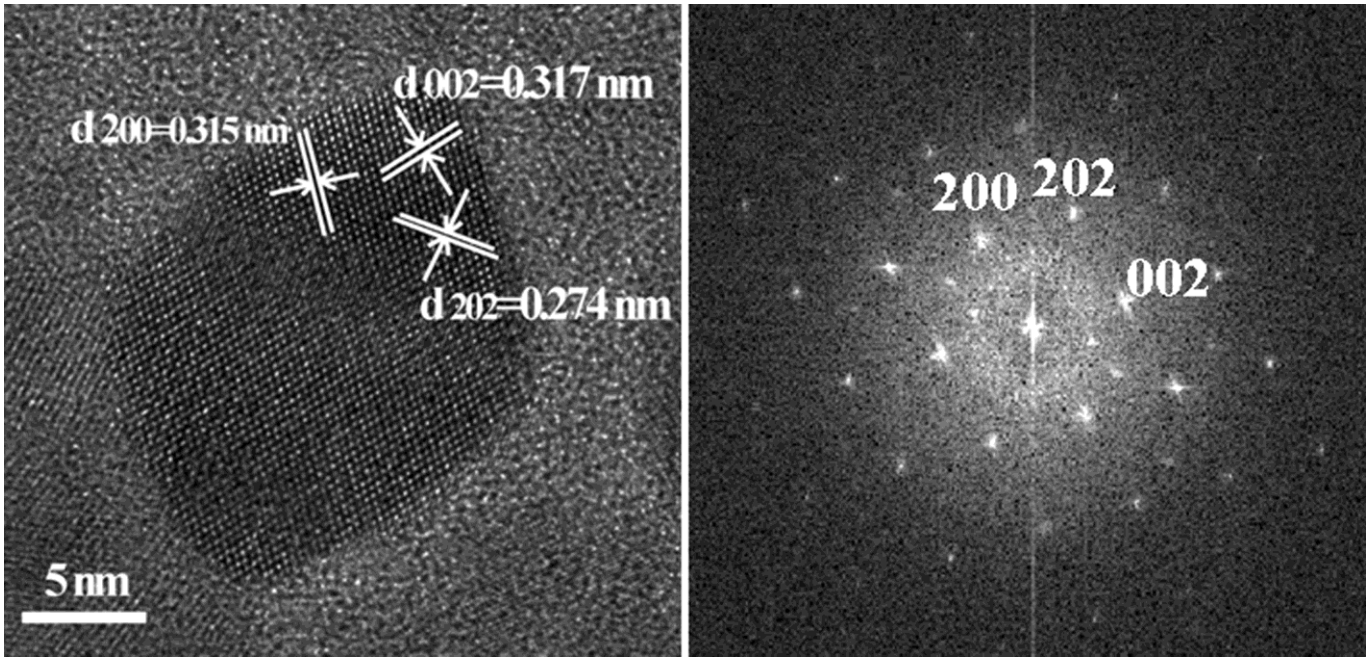

Figure S4. (a) HR-TEM image of a single Cu_2SnS_3 nanocrystal; (b) The corresponding FFT image.

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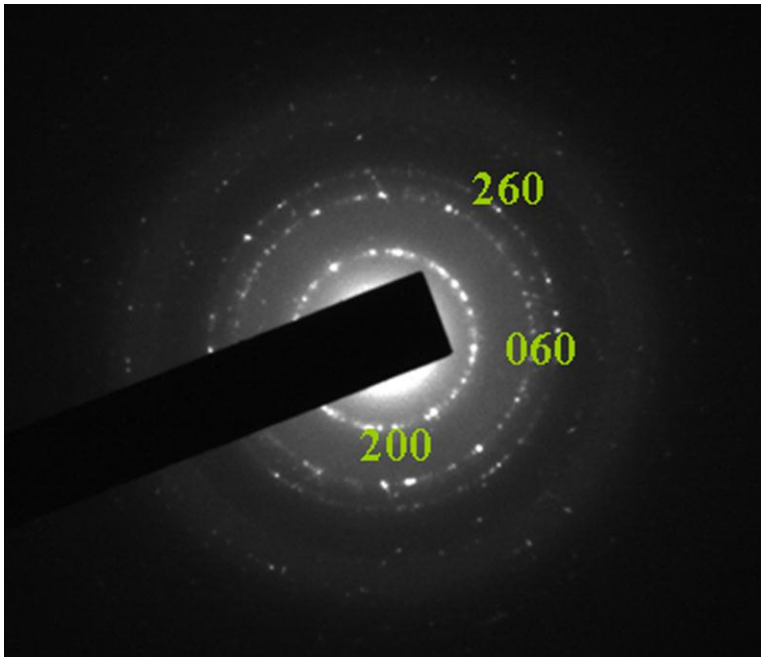

Figure S5. SAED pattern of the as-prepared Cu_2SnS_3 nanocrystals.

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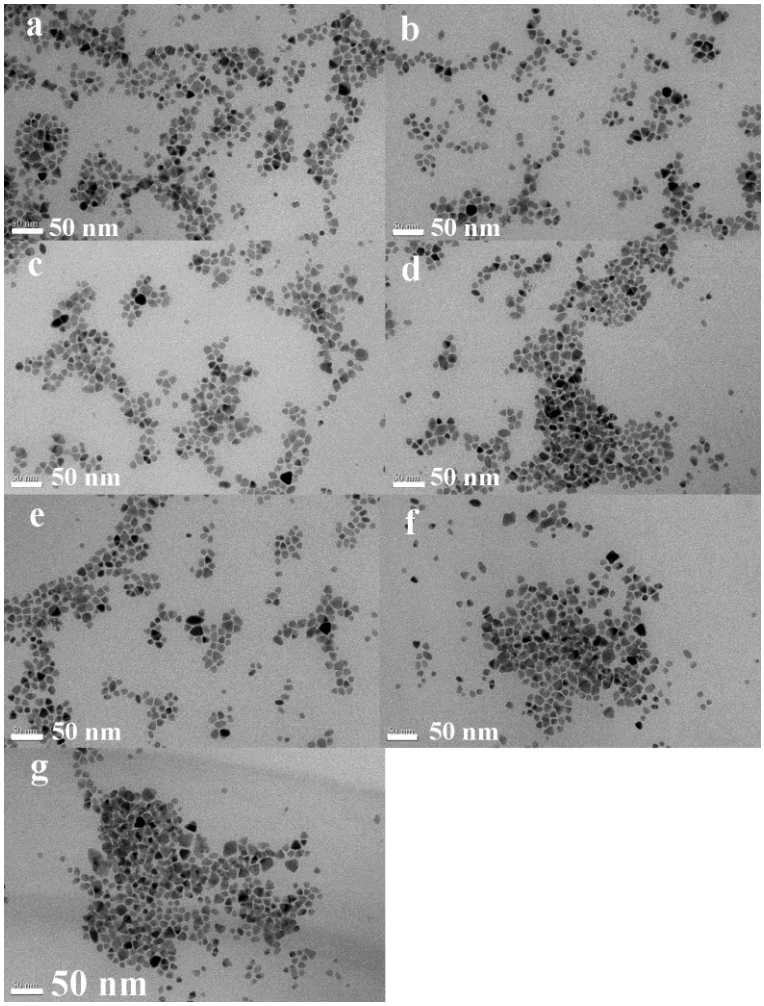

Figure S6. TEM image of $Cu_2Sn(S_xSe_{1-x})_3$ nanocrystals with (a) x=0, (b) x=0.2, (c) x=0.3, (d) x=0.5, (e) x=0.7, (f) x=0.8, (g) x=1.

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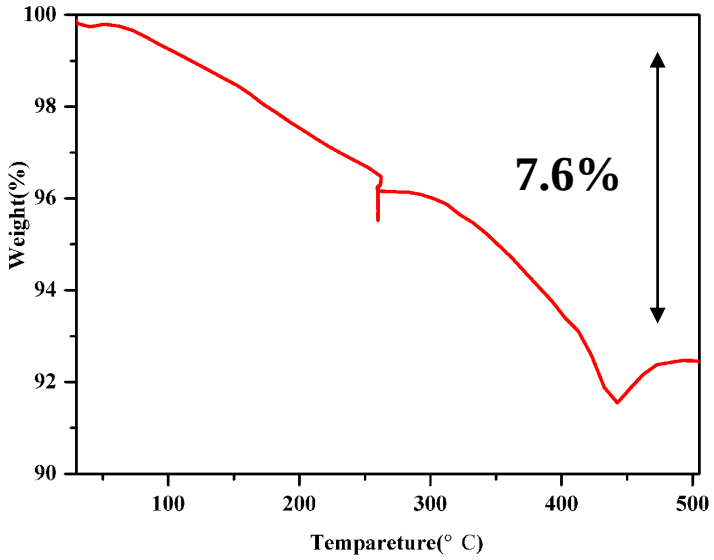

Figure S7. TGA analysis of $Cu_2Sn(S_{0.5}Se_{0.5})_3$ NCs prepared by a large-scale procedure. We can observe a slight weight loss before 261 °C related to the residual solvent. The weight loss observed at temperature over 261 °C can be ascribed to the evaporation of OAm and DDT. The OAm and DDT were completely removed when the temperature reached 442 °C. Based on these analyses, the relative weight of the $Cu_2Sn(S_{0.5}Se_{0.5})_3$ NCs in the final dried $Cu_2Sn(S_{0.5}Se_{0.5})_3$ NCs powders was estimated to be around 92.4%. Since the final dried $Cu_2Sn(S_{0.5}Se_{0.5})_3$ NCs powders we obtained is 2.0746 g and the initial precursors we used are 5 mmol, the chemical yield of our synthesis procedure is 92.98%.

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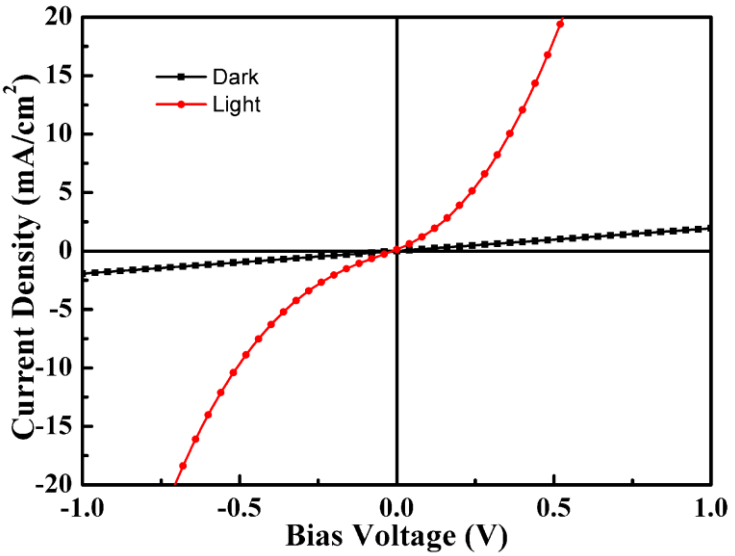

Figure S8. The current–potential (I–V) curve of the $Cu_2Sn(S_{0.5}Se_{0.5})_3$ film tested in the dark (black) and under illumination (red).