Supplementary Information

Controllable Synthesis of Metal Selenide Heterostructures Mediated by Ag_2Se Nanocrystals Acting as Catalysts

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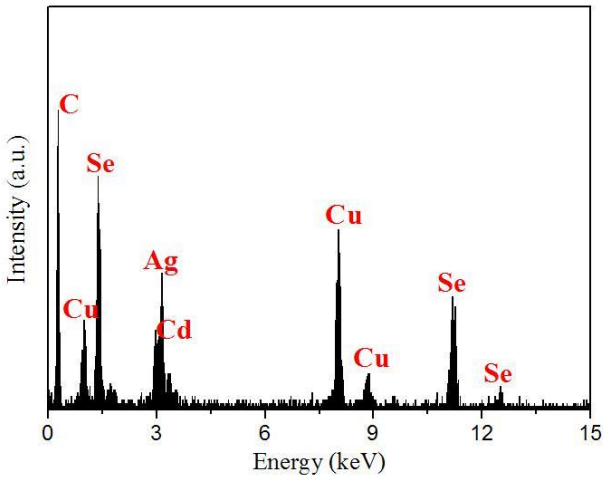

Figure S1. EDS spectrum of the Ag_2Se tip area of an individual Ag_2Se-CdSe nanoheterostructure, showing the existence of Ag, Cd and Se.

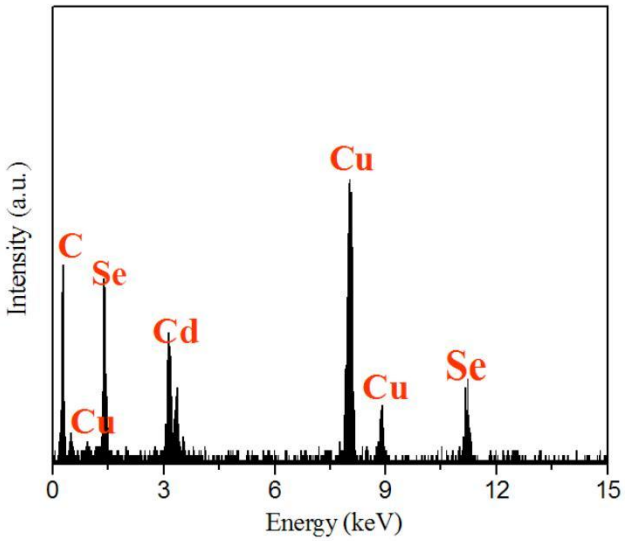

Figure S2. EDS spectrum of the CdSe segment of an individual Ag_2Se-CdSe nanoheterostructure, showing the existence of Cd and Se.

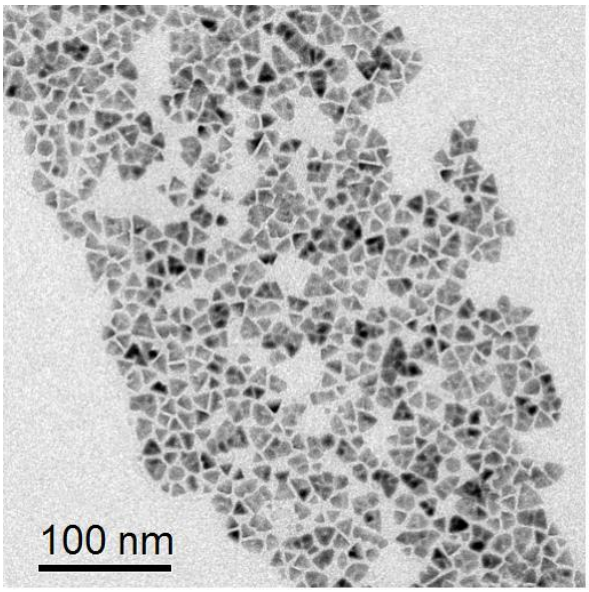

Figure S3. TEM micrograph of the cubic phase CdSe nanocrystals.

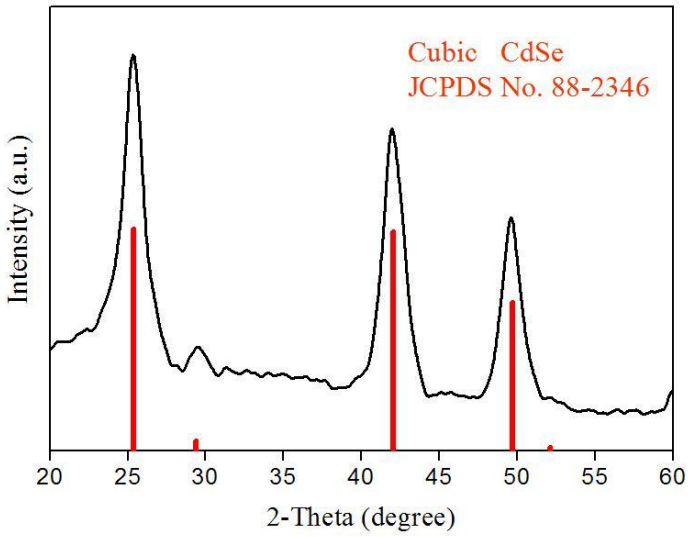

Figure S4. XRD pattern of the CdSe nanocrystals and standard data of cubic phase CdSe (JCPDS No. 88-2346).

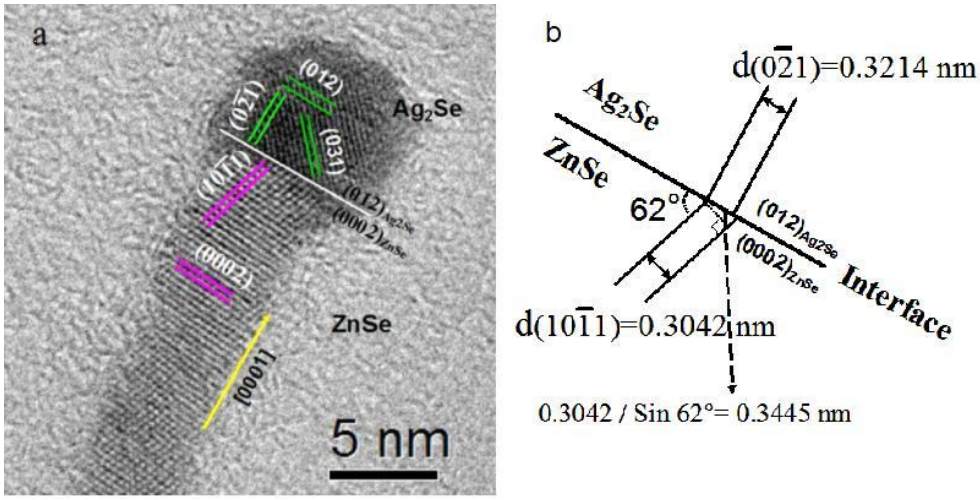

Figure S5. (a) HRTEM image of an individual Ag_2Se-ZnSe nanoheterostructure; (b) schematical illustration of the calculation of the lattice mismatch between $(0\bar{2}1)_{Ag2Se}$ and $(10\bar{1}1)_{ZnSe}$ at the interface.

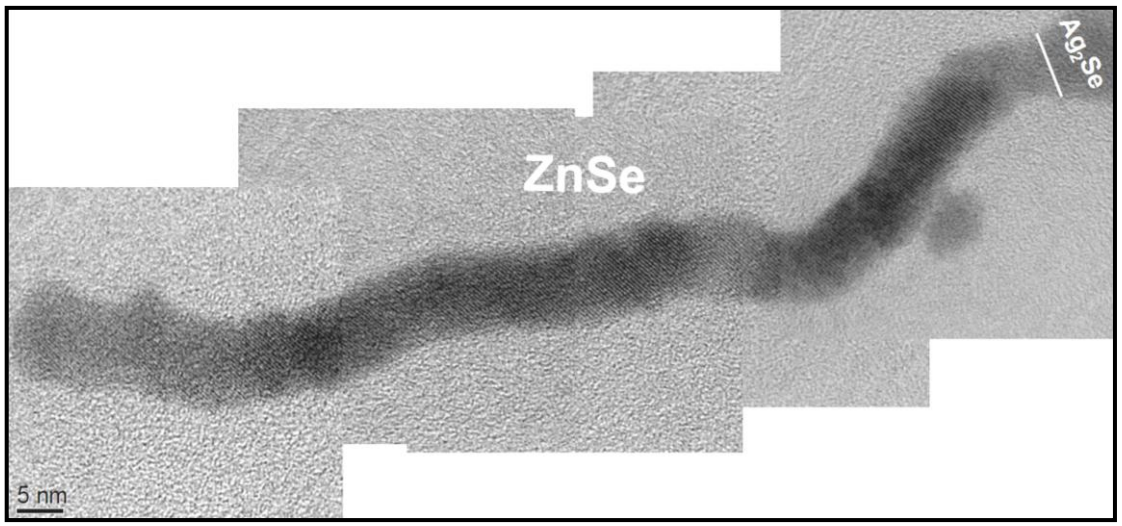

Figure S6. HRTEM image of an individual tortuous Ag_2Se-ZnSe nanoheterostructure (spliced by five HRTEM images taken from different segments of the nanoheterostructure)

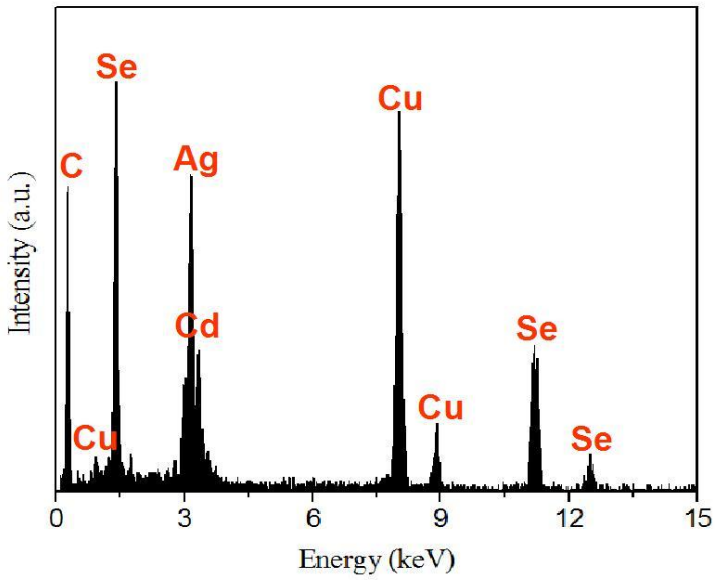

Figure S7. EDS spectrum from the Ag_2Se-CdSe region in an Ag_2Se-CdSe-ZnSe nanoheterostructure, showing the existence of Ag, Cd and Se.

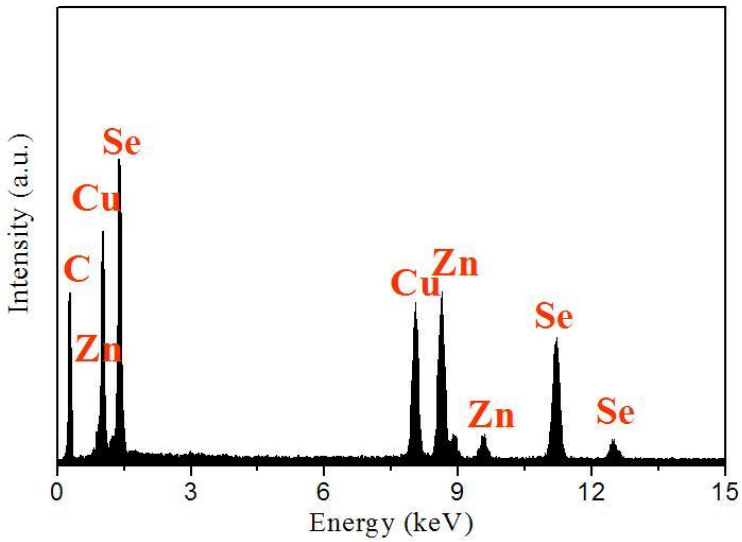

Figure S8. EDS spectrum from the ZnSe tail in an Ag_2Se-CdSe-ZnSe nanoheterostructure, showing the existence of Zn and Se.

Table S1. The calculated lattice mismatches of the possible plane-couplings for Ag_2Se and the second phase (CdSe or ZnSe) in present work

	CdSe $(10\bar{1}0)$	*CdSe* (0002)	*ZnSe* $(10\bar{1}0)$	*ZnSe* (0002)
Ag_2Se (002)	*0.8%*	*40.0%*	*8.5%*	*36.2%*
Ag_2Se (012)	*34.5%*	*11.1%*	*39.5%*	*6.7%*