

Electronic Supplementary Information

Formation of size-tunable CdS rhombic dodecahedra

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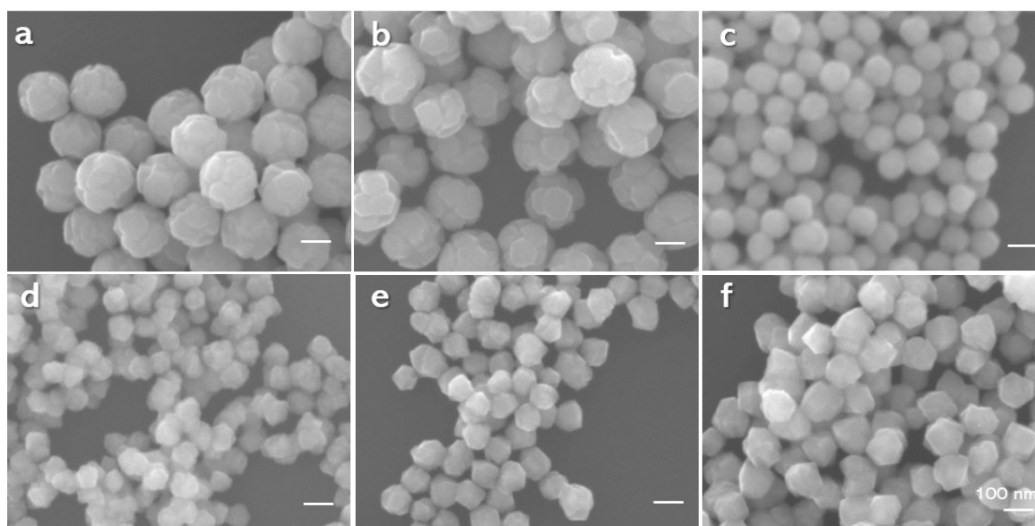


Fig. S1 SEM images of the CdS particles produced by adding (a) 0.1, (b) 0.2, (c) 0.4, (d) 0.6, (e) 0.8 and (f) 1.0 M of HNO₃ solution. All scale bars are equal to 100 nm.

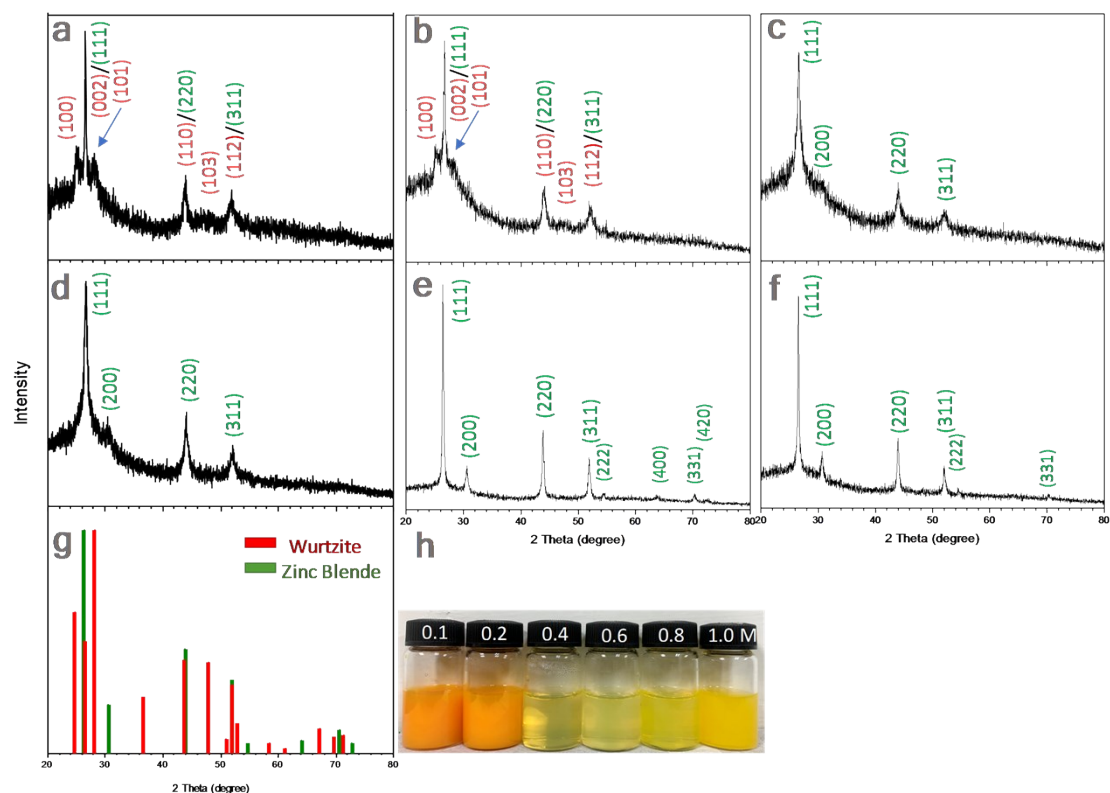


Fig. S2 (a–f) XRD patterns of the CdS particles synthesized by adding (a) 0.1, (b) 0.2, (c) 0.4, (d) 0.6, (e) 0.8 and (f) 1.0 M HNO₃ solution. (g) Standard XRD patterns of wurtzite and zinc blende CdS. (f) Photograph of the CdS particle solutions.

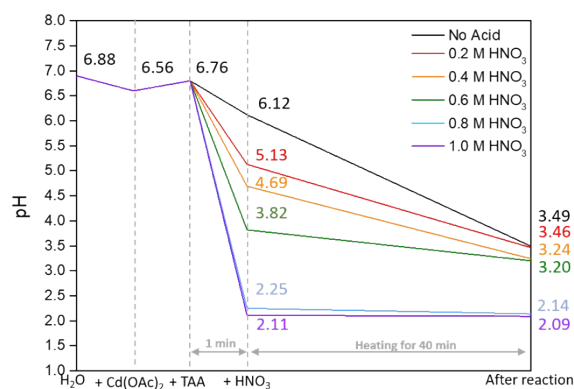


Fig. S3 Solution pH changes upon adding each reagent in the synthesis of CdS particles.

Table S1 Reagent amounts used to grow size-tunable CdS rhombic dodecahedra.

Size (nm)	Water bath temperature	Water	0.1 M Cd(CH ₃ COO) ₂	0.05 M TAA	1.0 M HNO ₃	Oven temperature	Time
64 nm	29 °C	8.44 mL	400 μL	1000 μL	160 μL	110 °C	40 min
83 nm	27 °C						
99 nm	25 °C						
110 nm	24 °C						
150 nm	23 °C						

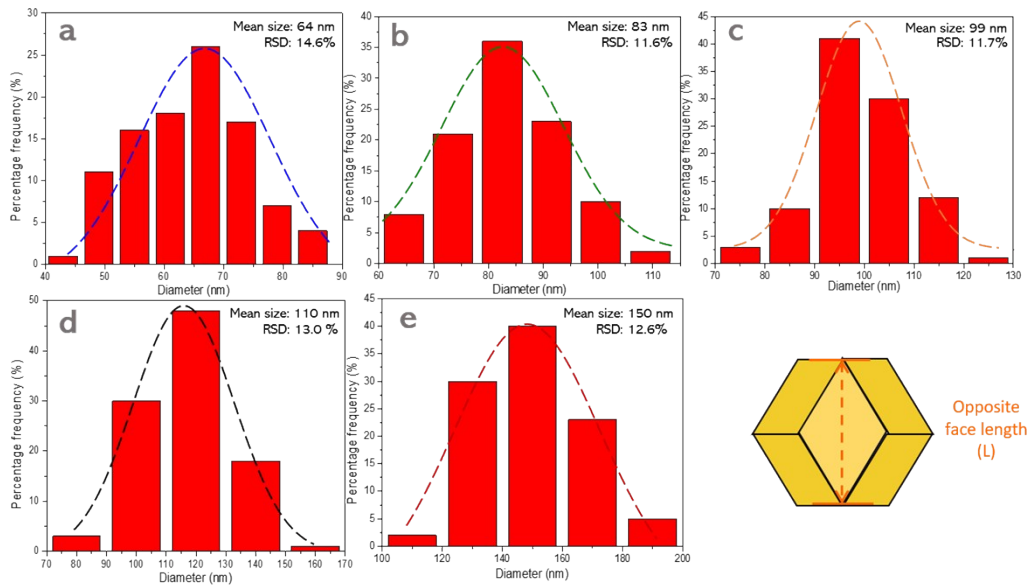


Fig. S4 (a–e) Size distribution histograms of the synthesized CdS rhombic dodecahedra with tunable sizes.

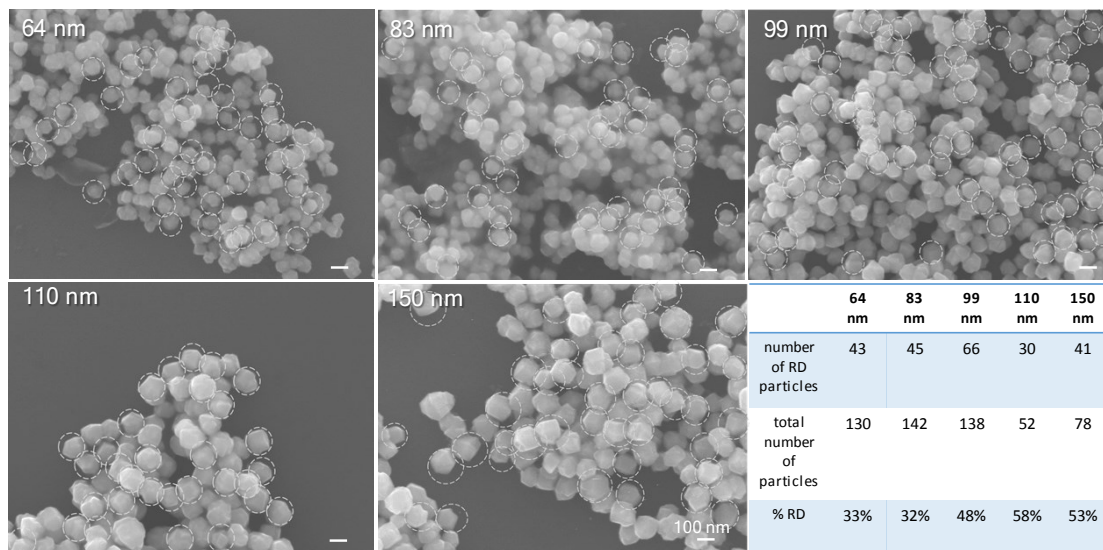


Fig. S5 SEM images of the size-tunable rhombic dodecahedral CdS samples with clearly RDs marked in circles. The estimated RD particle percentages determined from these SEM images are provided.

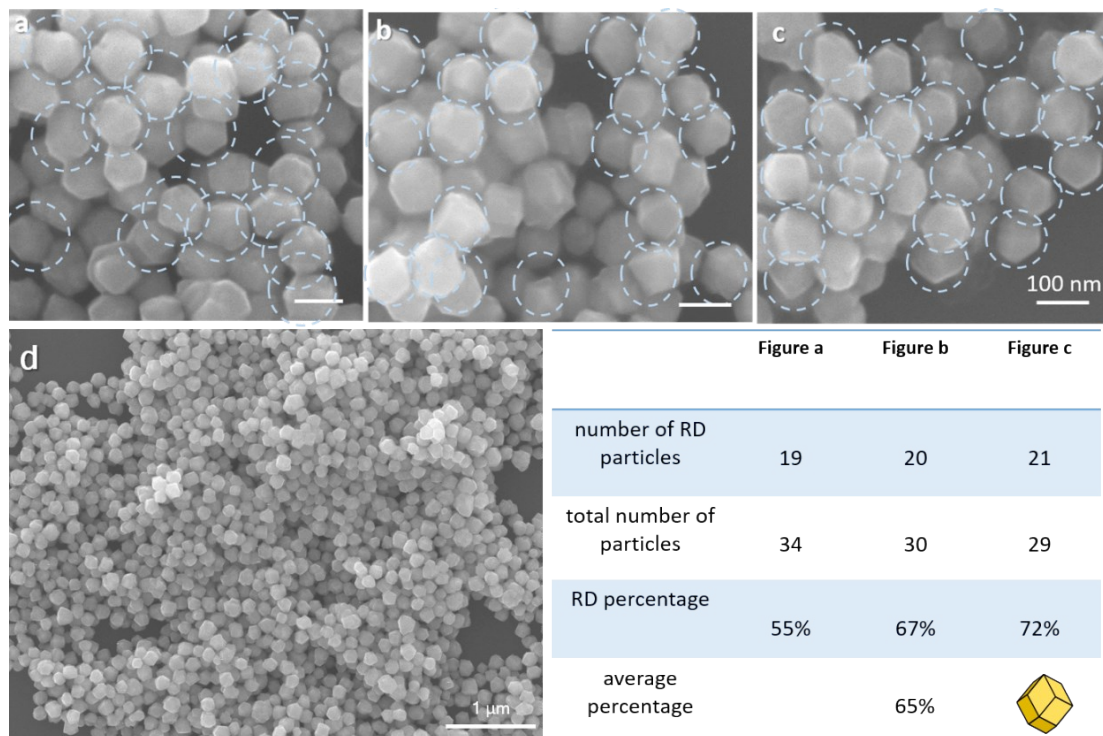


Fig. S6 (a–d) Additional SEM images of the 110 nm rhombic dodecahedral CdS sample showing a higher RD particle yield.

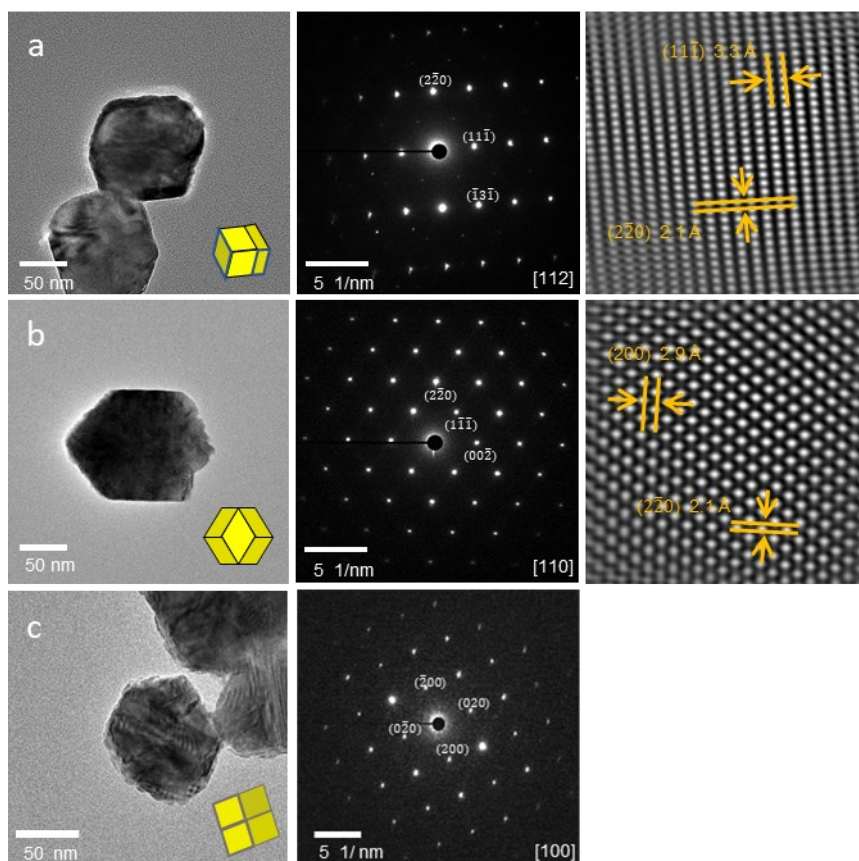


Fig. S7 TEM and HR-TEM images, SAED patterns, and particle models of CdS rhombic dodecahedra viewed along the (a) [112], (b) [110] and (c) [100] directions. In panel (c), the particle does not exactly match with a RD shape, but its SAED pattern agrees with the [100] particle orientation.

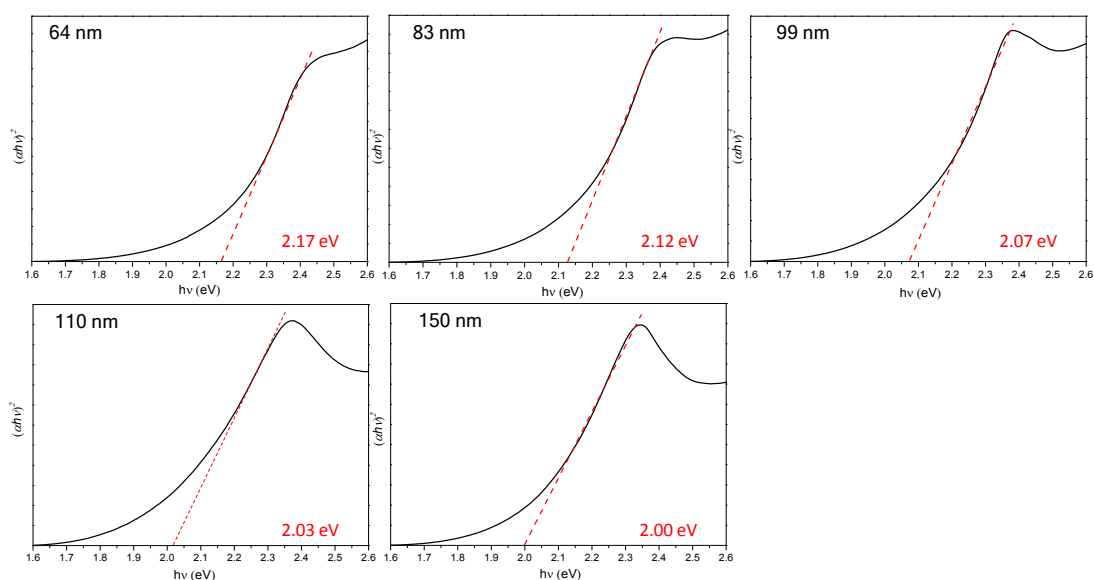


Fig. S8 Tauc plots converted from UV-vis spectra for the synthesized size-tunable CdS rhombic dodecahedra.

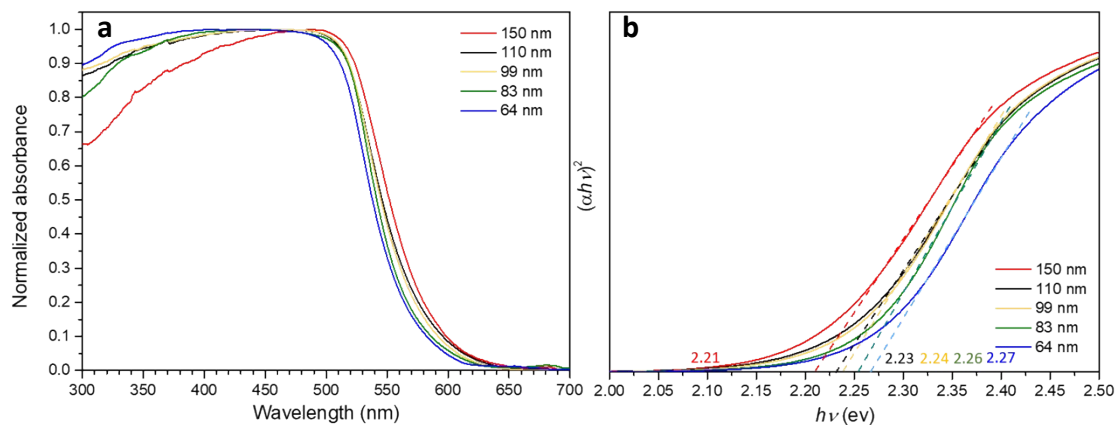


Fig. S9 (a) Diffuse reflectance spectra of the synthesized size-tunable CdS rhombic dodecahedra and (b) the converted Tauc plots for band gap determination.

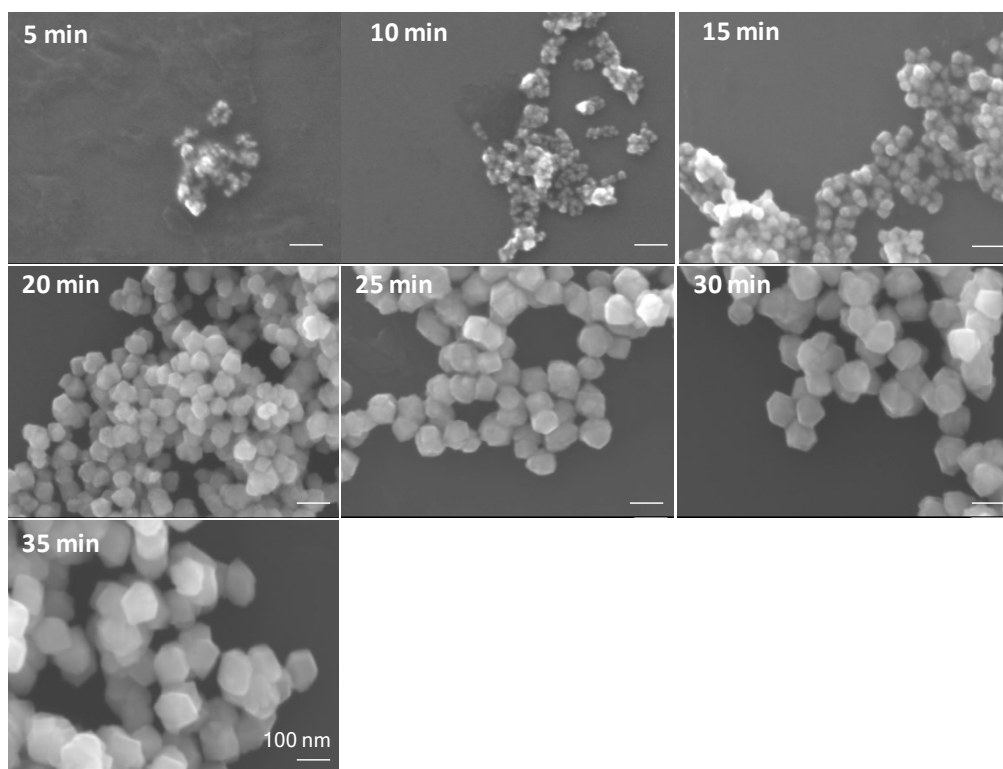


Fig. S10 SEM images showing the evolution in the formation of CdS rhombic dodecahedra. Scale bars are all equal to 100 nm.

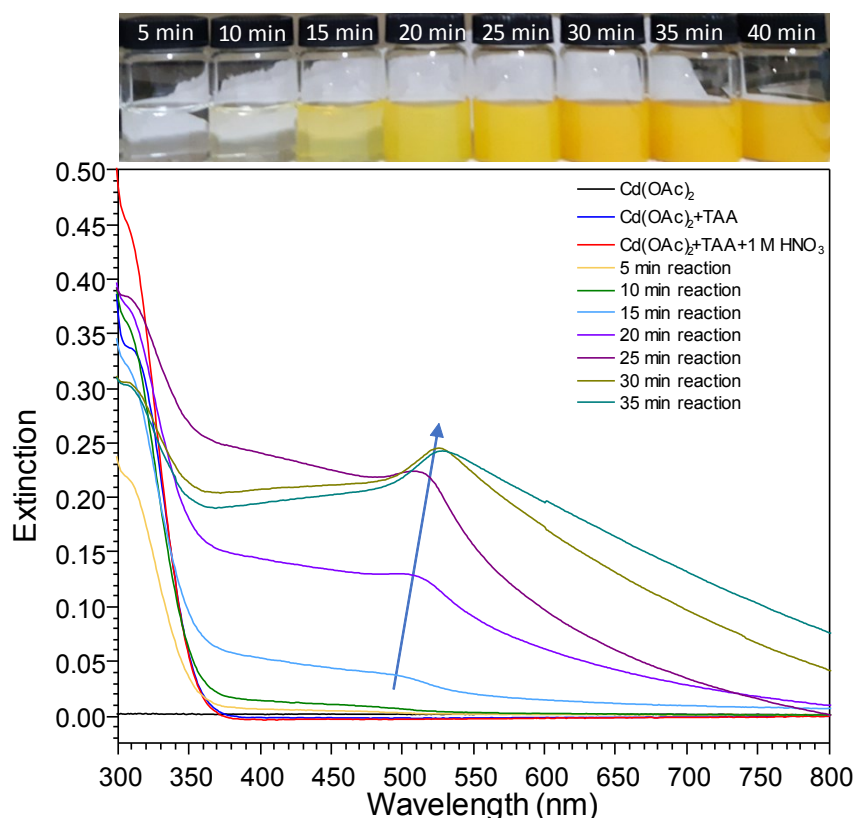
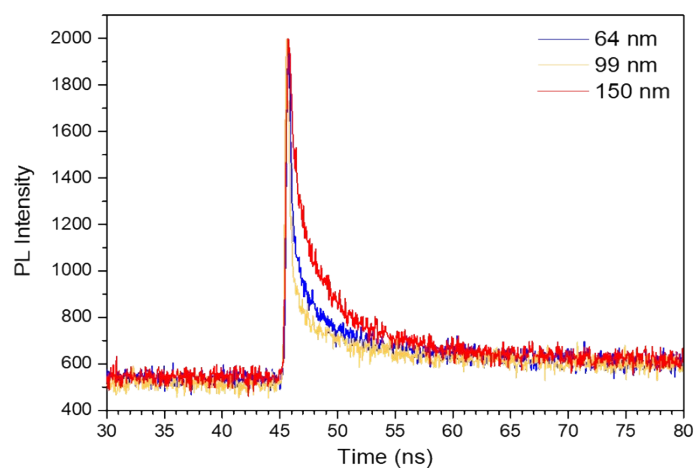


Fig. S11 Photograph and UV-vis spectra taken in the growth of 110 nm CdS rhombic dodecahedra. Reaction time is labeled for each sample.



	A_1	$\tau_1(\text{ns})$	A_2	$\tau_2(\text{ns})$	$\tau_{av}(\text{ns})$	χ^2
150 nm	938.5	5.681	1872	0.2885	5.185	1.2437
99 nm	602.8	3.875	14716	0.06079	2.819	1.1411
64 nm	723.3	3.996	8325	0.08112	3.255	1.1016

Fig. S12 Time-resolved photoluminescence of different-sized CdS rhombic dodecahedra. Emission lifetimes can be derived from the TRPL data. The excitation wavelength is 375 nm. The recorded emission wavelengths are 534, 539, and 552 nm for 64, 99, and 150 nm CdS rhombic dodecahedra, respectively.

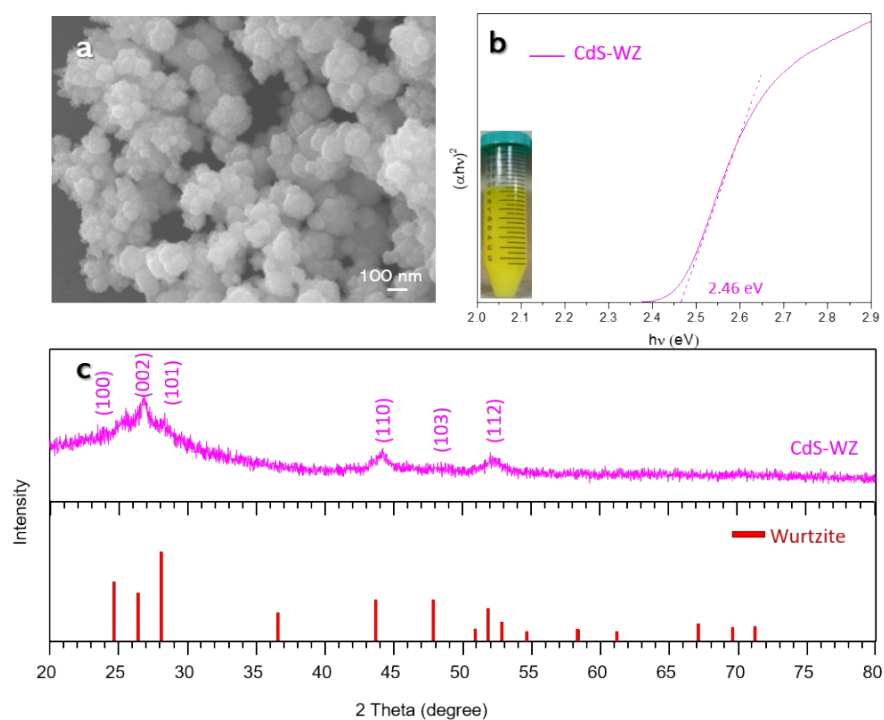


Fig. S13 (a) SEM image of the prepared CdS particles having a wurtzite crystal structure. (b) Tauc plot of CdS particles for band gap determination. A photograph of the yellow particle solution is provided. (c) XRD pattern of the CdS sample.