Designer Nanomaterials for Solar Cells and LEDs
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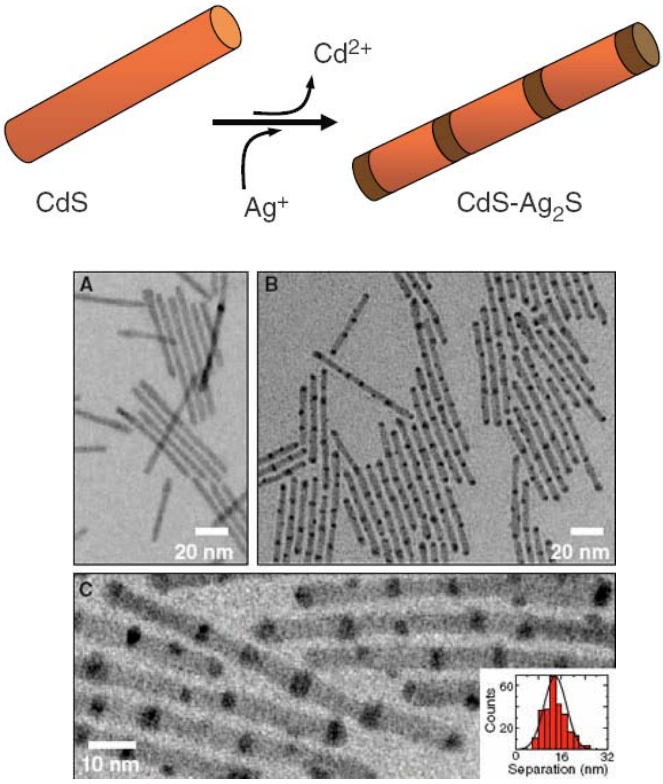
An inherently inexpensive solution-phase processing by use of "exchange of cations" and "strain engineering" methodologies has been developed. *Ab initio* calculations suggested that if only a fraction of the cations were exchanged, the naturally occurring strain due to the change in composition could be the driving force for inducing the spontaneous formation of superlattice structures. As predicted by theory, a linear arrangement of regularly spaced silver sulfide bands appeared in the cadmium sulfide nanorods when approximately 36% of the cations were exchanged. The resulting striped nanorods display properties expected of an epitaxially prepared array of silver sulfide quantum dots separated by confining regions of cadmium sulfide, including the ability to emit near-infrared light. Computer modeling suggests that it should be possible to control their superlatticed pattern—hence their properties—by adjusting the length, width, composition, etc. of the original nanocrystals.



References/Publication

Robinson, R. D., B. Sadtler, D. O. Demchenko, C. K. Erdonmez, L.-W. Wang, A. P. Alivisatos, *Science*, **317**, 355 (2007).