

Utilizing the lability of lead selenide to produce heterostructured nanocrystals with bright, stable infrared emission

Jeffrey M. Pietryga, Donald J. Werder, Darrick J. Williams¹, Joanna L. Casson, Richard D. Schaller,

*Victor I. Klimov and Jennifer A. Hollingsworth**

Chemistry Division, Los Alamos National Laboratory, Los Alamos, New Mexico, 87545; ¹Center for

Integrated Nanotechnologies, Los Alamos National Laboratory, Los Alamos, New Mexico, 87545

Corresponding author email address: jenn@lanl.gov

Supporting Information

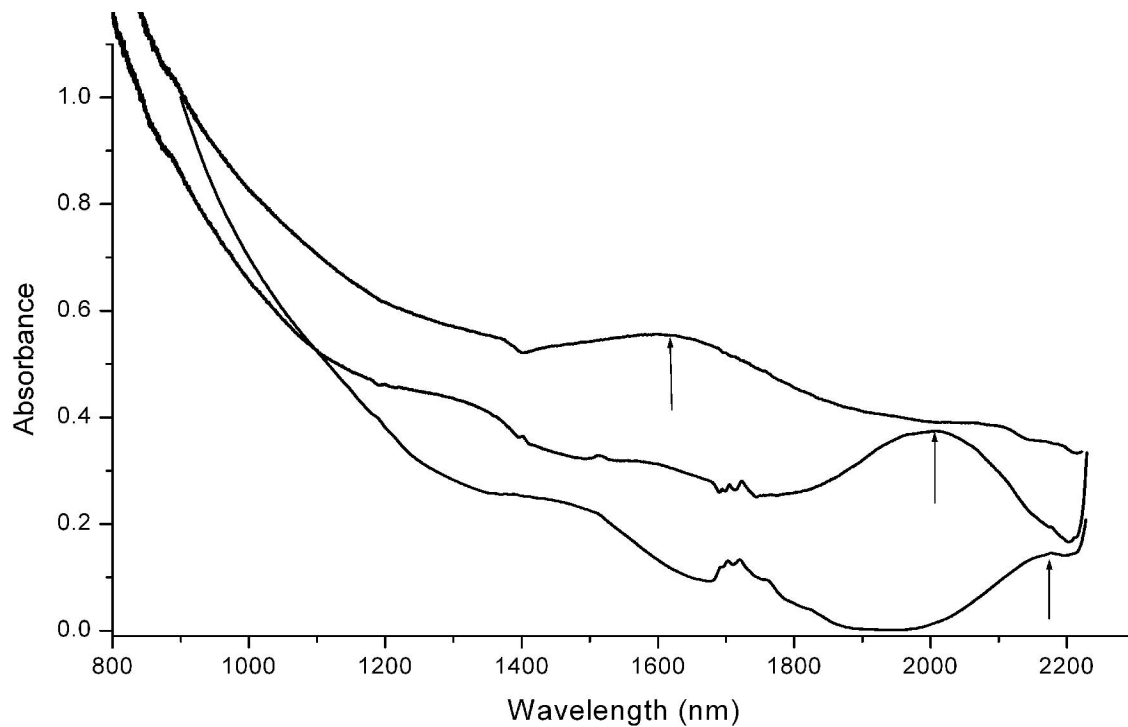


Figure S-1. Absorption spectra corresponding to PL spectra depicted in **Figure 1**. Arrows indicate location of 1s absorption features, which shifts to lower wavelengths as one goes from no shell (bottom) to a 0.7 nm shell (middle) and to a 1.4 nm shell (top). A consistent Stokes shifts of ~40 nm was found in each case.

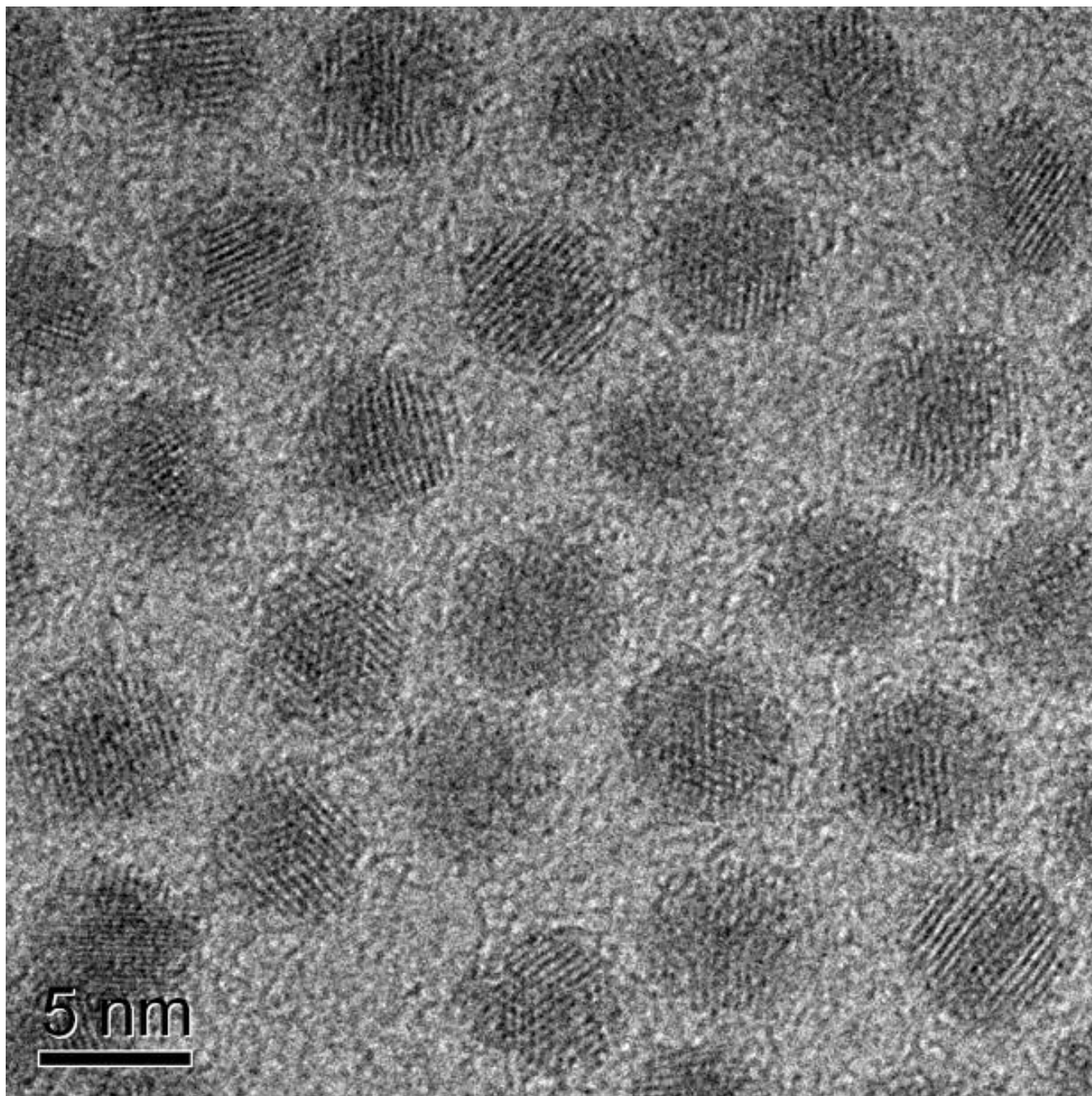


Figure S-2. HRTEM image of PbSe/CdSe NQDs showing discontinuous domains of PbSe and CdSe. CdSe lattice fringes from a relatively thick shell often obscure the PbSe core lattice fringes, but the discontinuous nature of the core/shell alignment is apparent in several individual NQDs.

SAMPLE ID	LAB ID	ANALYSIS	RESULTS		RETEST RESULTS	
JMP-1278-1	B-8296	Lead	9.32	%		
		Cadmium	3.37	%		
		Selenium	5.04	%		
		Carbon	16.00	%		
JMP-1278-2	B-8297	Lead	13.9	%		
		Cadmium	7.20	%		
		Selenium	8.90	%		
		Carbon	15.52	%		
JMP-1278-3	B-8298	Lead	33.9	%	81.7	µg
		Cadmium	36.5	%	83.9	µg
		Selenium	31.1	%	79.3	µg
		Phosphorus	414	ppm	<1.3	µg
		Carbon	21.09	%		
JMP-1278-CORE	B-8299	Lead	20.1	%		
		Selenium	6.43	%		
		Phosphorus	455	ppm		
		Carbon	15.43	%		

Table S-1. Full elemental analysis report from Galbraith Laboratories on aliquots taken during CdSe shell formation. Concentrations of selected elements were determined by ICP-OES. JMP-1278-CORE, JMP-1278-1, JMP-1278-2 and JMP-1278-3 refer to the four samples depicted in **Figure 1**, progressing from no CdSe shell to the thickest CdSe shell.

SAMPLE ID	LAB ID	ANALYSIS	RESULT(S)	
Core	C-5465	Lead	11.2	%
		Cadmium	30.0	%
		Zinc	169	ppm
		Selenium	21.2	%
		Sulfur (ICP)	375	ppm
4	C-5466	Lead	9.03	%
		Cadmium	25.1	%
		Zinc	11.0	%
		Selenium	17.1	%
		Sulfur (ICP)	5.37	%

Table S-2. Full elemental analysis report from Galbraith Laboratories on PbSe/CdSe (denoted “Core”) and PbSe/CdSe/ZnS (“4”) NQDs depicted in **Figure 6 (a. and c., respectively)**. Concentrations of selected elements were determined by ICP-OES.