To dope Mn^{2+} in a semiconducting nanocrystal

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Supporting Information

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Table S1: Ionic radius values for the relevant ions, taken from ref. 1 and ref. 2

Ion	Ionic radius[ref. 1] (Å)	Ionic radius[ref. 2] (Å)
Zn^{2+}	0.83	0.83
Mn^{2+}	0.91	0.91
Cd^{2+}	1.03	0.99
S^{2-}	1.74	-

Fig. S1: Powder X-ray diffraction pattern of ZnS nanocrystals along with the reference patterns for bulk ZnS in both wurtzite (WZ) and zinc-blende (ZB) phase.

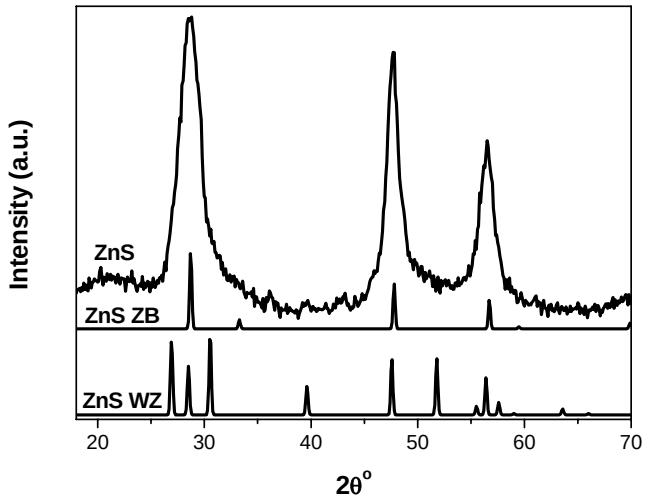


Fig. S2: UV-visible absorption spectra of $Zn_xCd_{1-x}S$ NCs for different values of "x".

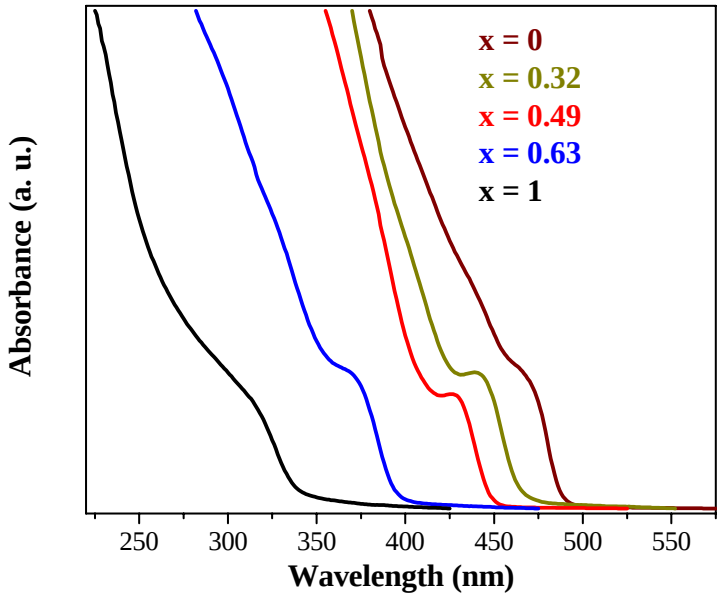


Fig. S3: Powder X-ray diffraction patterns for $Zn_{0.49}Cd_{0.51}S$ NCs doped with different concentration of manganese. Reference XRD pattern for bulk WZ of CdS, MnS and ZnS are taken from ICSD.

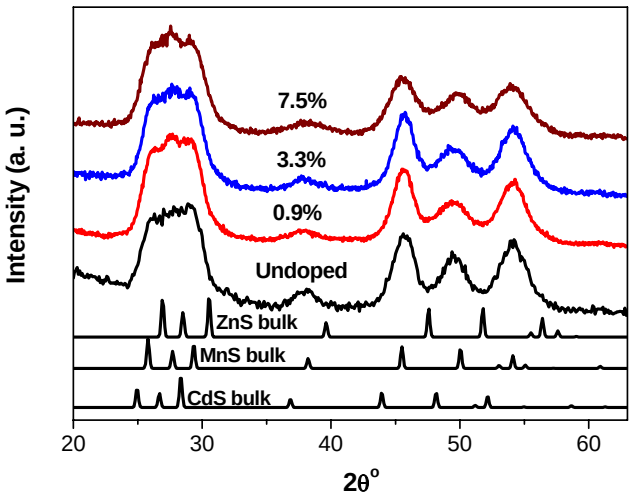
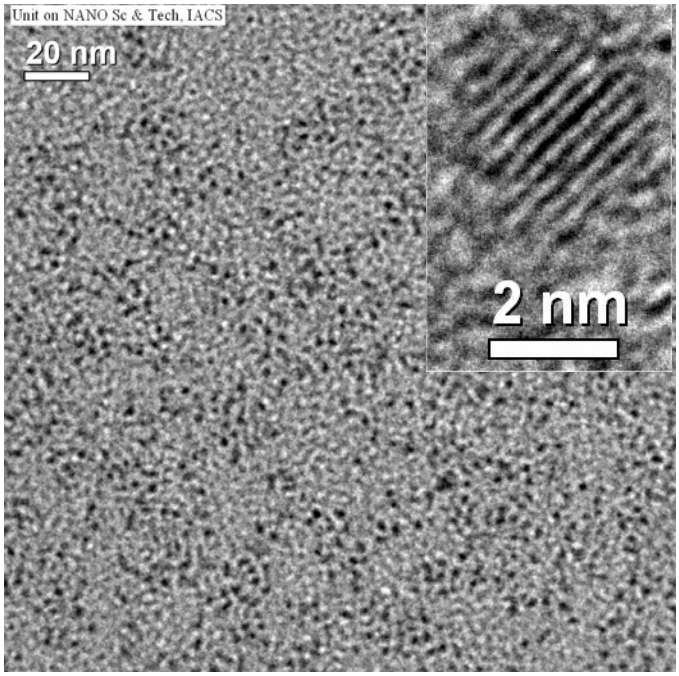
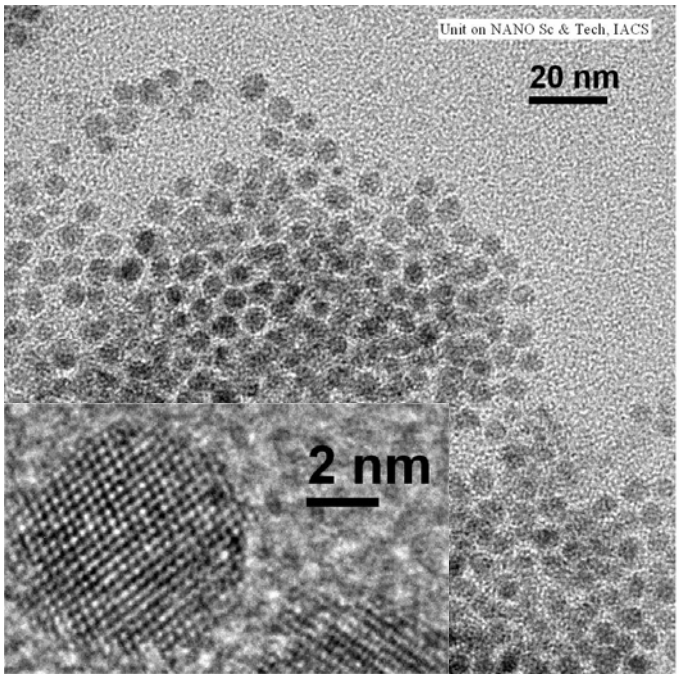


Fig. S4: TEM images of Mn^{2+}-doped $Zn_{0.49}Cd_{0.51}S$ NCs with 15% Mn^{2+} precursor in the reaction mixture; (a) after 5 seconds of the reaction time, (b) the final product obtained after 1800 seconds of reaction time and (c) NCs obtained after etching the final product in Fig. S3b.

(a)



(b)



(c)

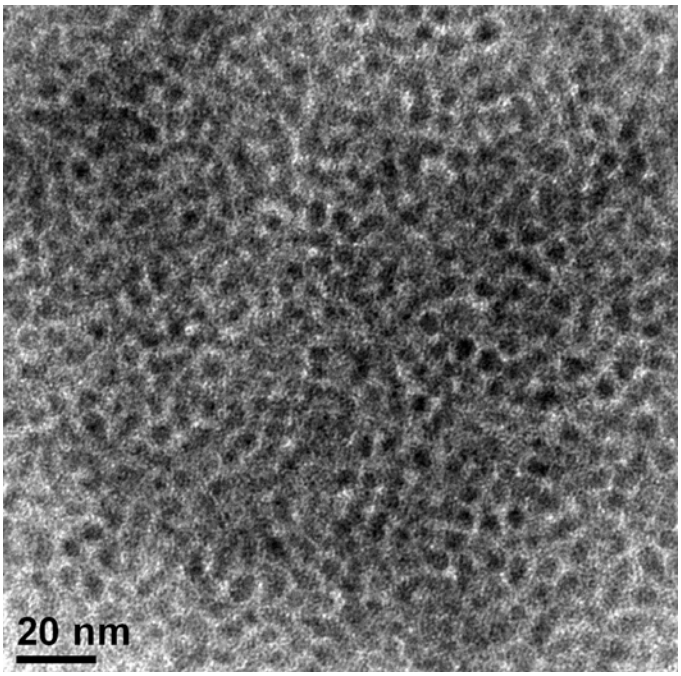


Table S2: Emission intensities for bandgap emission, Mn^{2+} d-emission, total PL emission and Mn^{2+} d-emission per Mn^{2+} ion from Mn^{2+}-doped $Zn_{0.49}Cd_{0.51}S$ NCs with different dopant concentrations. All the intensities mentioned here are normalized by their corresponding absorbance at the excitation wavelength.

% of manganese	Bandgap emission intensity	Mn^{2+} d-emission intensity	Total emission intensity	Average number of manganese per NC	Mn^{2+} d emission intensity per Mn^{2+} ion
0	998237	0	998237	0	-
0.5	308025	634067	942092	18.0	35177.1
0.9	161077	801944	963021	32.4	24717.0
1.7	103764	681867	785631	61.3	11126.2
3.3	74691	339208	413899	119.0	2851.3
7.5	37612	48122	85734	270.4	178.0

Reference:

1. Chen, D. M.; Yang, C. S.; Chuang, F. B.; Tzeng, Y. W.; Wei, C. C.; Ro, C. S.; Lan, K. Y.; Chou, W. C.; Lan, W. H.; Uen, W. Y. *Chinese J.l of Phys.* **2000**, *38*, 74.
2. Zhikharevich, V.V.; Ostapov, S.E.; Deibuk, V.G. *Semiconductor Physics, Quantum Electronics and Optoelectronics* **2006**, 9, 17.