Supporting Information

Direct Patterning of Quantum Dot Nanostructures via Electron Beam Lithography

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Synthesis of TOPO functionalized CdSe/ZnS quantum dots (QDs):

CdSe/ZnS core-shell QDs[i] were prepared according to the reported procedure. Briefly, CdO (0.0514 g, 0.4 mmol), tetradecyl phosphonic acid (TDPA) (0.2232 g, 0.8 mmol) and trioctylphosphine oxide (TOPO) (3.7768 g, 9.77 mmol) were loaded into a 50 ml three-neck flask and heated to 350 ^{o}C under Ar flow. After 3 h the temperature was decreased to 270 ^{o}C and the Se solution (Se (0.042 g, 0.53 mmol) in 2.4 ml tributyl phosphine (TOP)) was swiftly injected into the hot solution. The CdSe QDs were purified and precipitated with $CHCl_3$ and MeOH, and finally dissolved in $CHCl_3$. Then, the CdSe core solution was mixed with TOPO (4 g, 10.3 mmol) and hexadecylamine (HDA) (1.5 g, 6.2 mmol) and heated to 150 ^{o}C for 1 h. Diethylzinc ($ZnEt_2$) (1.6 ml, 1.6 mmol) in 2.4 ml TOP and and hexamethyl-disilathiane $(TMS)_2S$ (0.278 ml, 1.3 mmol) in 5.25 ml TOP were used as shell solution. After injecting the shell solution the QD mixture was reacted for 1 h at 100 ^{o}C. The resulting CdSe/ZnS QDs were purified and precipitated with $CHCl_3$ and MeOH, and finally stored in toluene.

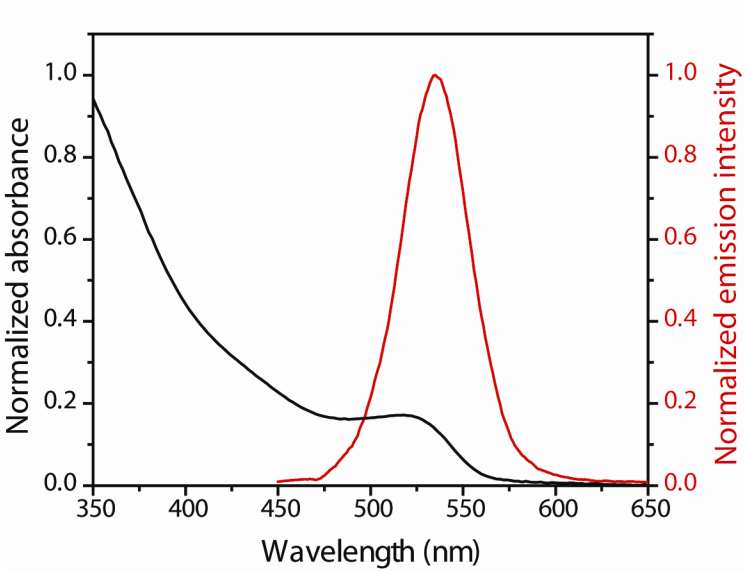

Fig 1. The absorption and emission spectra of TOPO functionalized QDs.

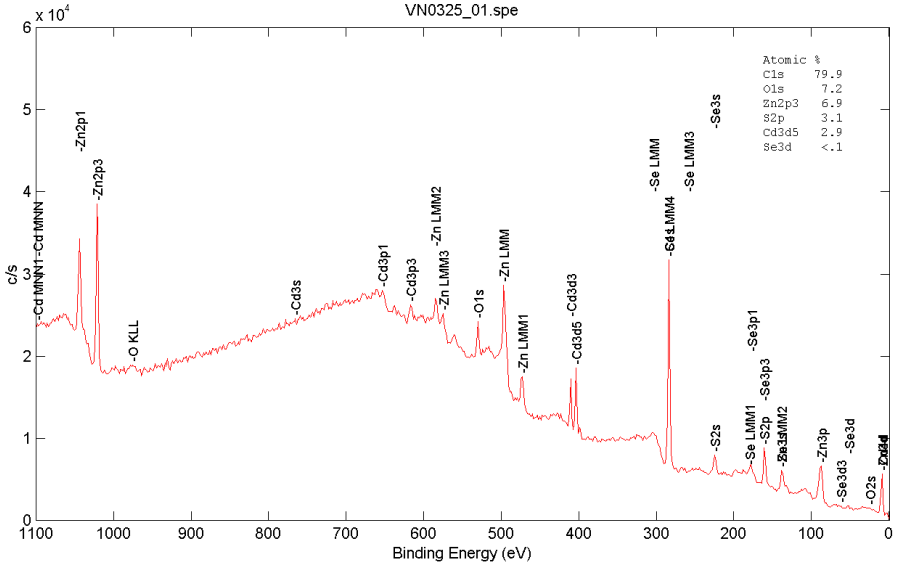

Fig 2. XPS spectrum of QD film before e-beam exposure.

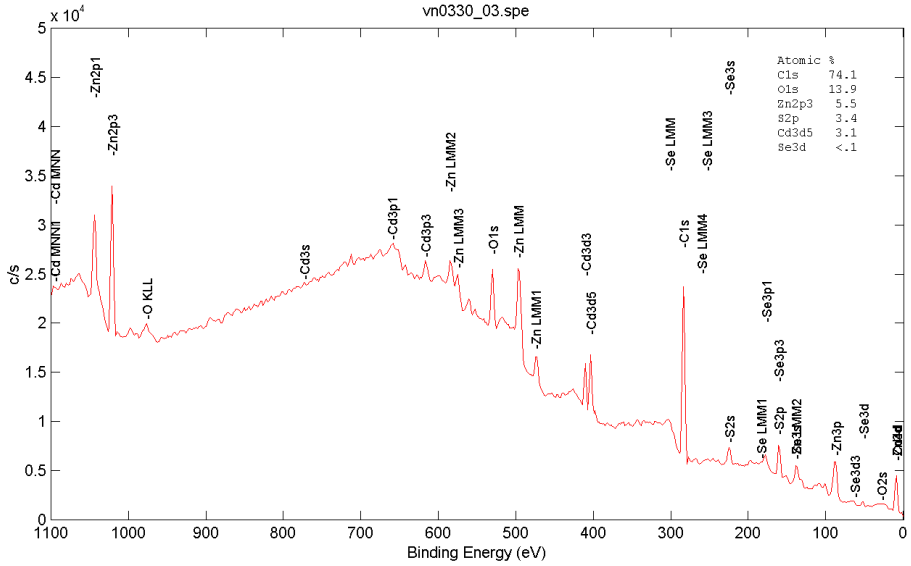

Fig 3. XPS spectrum of QD film after e-beam exposure.

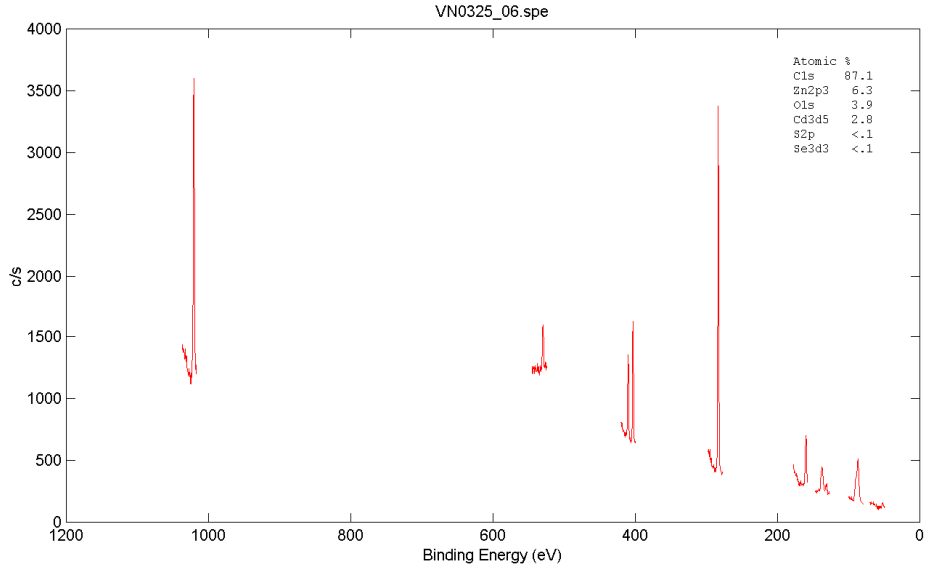

Fig 4. XPS spectrum of selected elements on QD film before e-beam exposure.

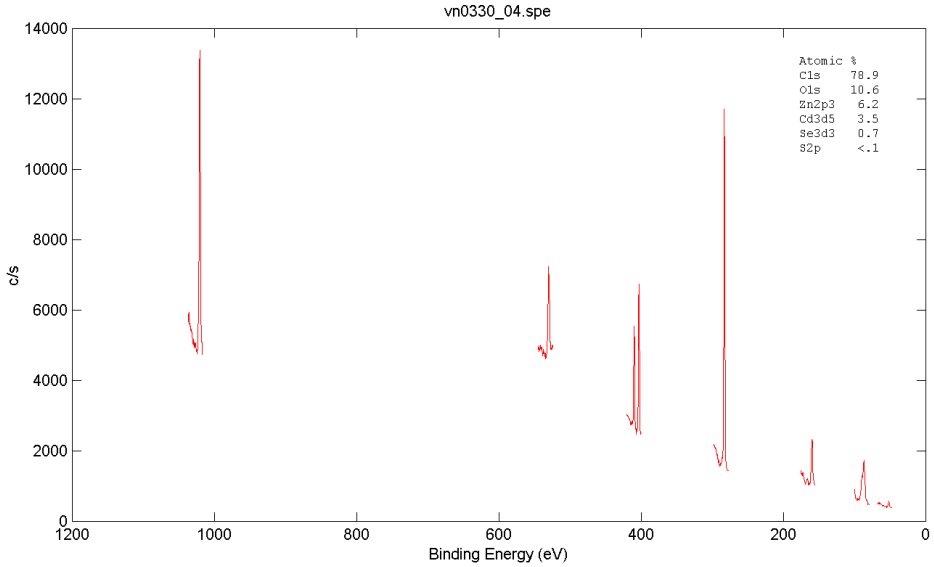

Fig 5. XPS spectrum of selected elements on QD film before e-beam exposure.

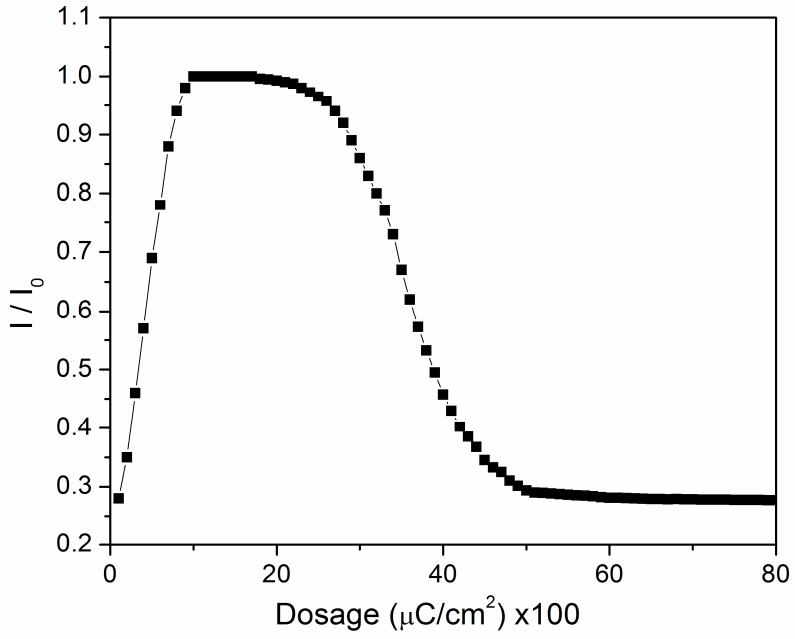

Fig 6. Fluorescence intensity map of developed QD test pattern at different e-beam dosages.

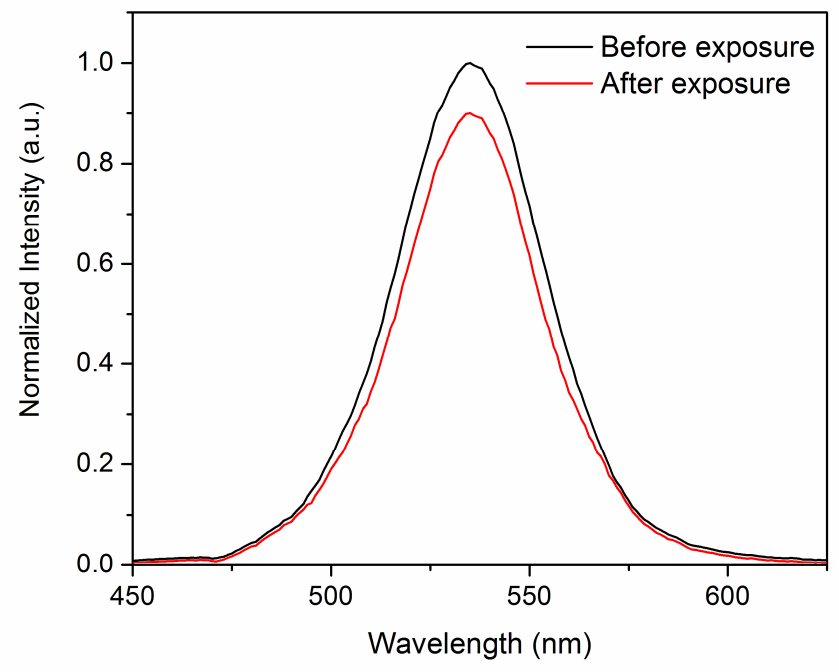

Fig 7. Emission spectra of QD film before and after e-beam exposure.

[i] (a) Z. A. Peng and X. G. Peng, *J. Am. Chem. Soc.,* 2001, **123**, 183. (b) B. O. Dabbousi, J. Rodriguez-Viejo, F. V. Mikulec, J. R. Heine, H. Mattoussi, R. Ober, K. F. Jensen and M. G. Bawendi, *J. Phys. Chem. B*, 1997, **101**, 9463.