Supporting Information

Silica-Coated Mn-Doped ZnS Nanocrystals for Cancer Theranostics

Edison Huixiang Ang,[1,2,†*] Jialiu Zeng,[1,3,‡] Gomathy Sandhya Subramanian,[1] Vijila Chellappan,[1] Thankiah Sudhaharan,[4,5,§] Parasuraman Padmanabhan,[6] Balázs Gulyás,[6] and Subramanian Tamil Selvan [1,6,‖,*]

[1] A*STAR Institute of Materials Research & Engineering, 2 Fusionopolis Way, Innovis, Singapore 138634

[2] National Institution of Education, Nanyang Technological University, 1 Nanyang Walk, Singapore 637616

[3] Department of Biomedical Engineering, Boston University, Boston, MA 02215, USA

[4] Institute of Medical Biology, A*STAR, Singapore 138648

[5] Skin Research Institute of Singapore, A*STAR, Singapore 138648

[6] Translational Neuroscience Laboratory, Lee Kong Chian School of Medicine, Nanyang Technological University, 59 Nanyang Drive, Singapore 636921

[†] Present address: National Institution of Education, Nanyang Technological University, 1 Nanyang Walk, Singapore 637616

[‡]Present address: Department of Biomedical Engineering, Boston University, Boston, MA 02215, USA

[§]Present address: Skin Research Institute of Singapore, A*STAR, Singapore 138648

[‖]Present address: Translational Neuroscience Laboratory, Lee Kong Chian School of Medicine, Nanyang Technological University, 59 Nanyang Drive, Singapore 636921

*Correspondence: edison.ang@nie.edu.sg, subra.selvan@ntu.edu.sg

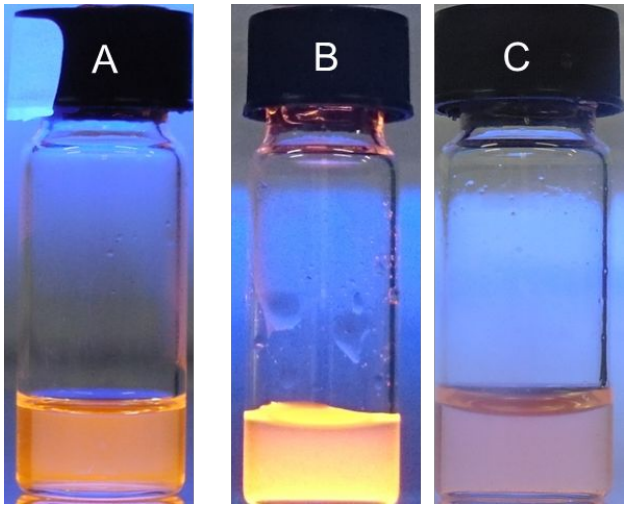

Figure S1. Fluorescent digital images of nanocrystals excited at the wavelength of 300 nm. (A) ZnS:Mn; (B) ZnS:Mn@GSH; (C) ZnS:Mn@GSH@Silica.

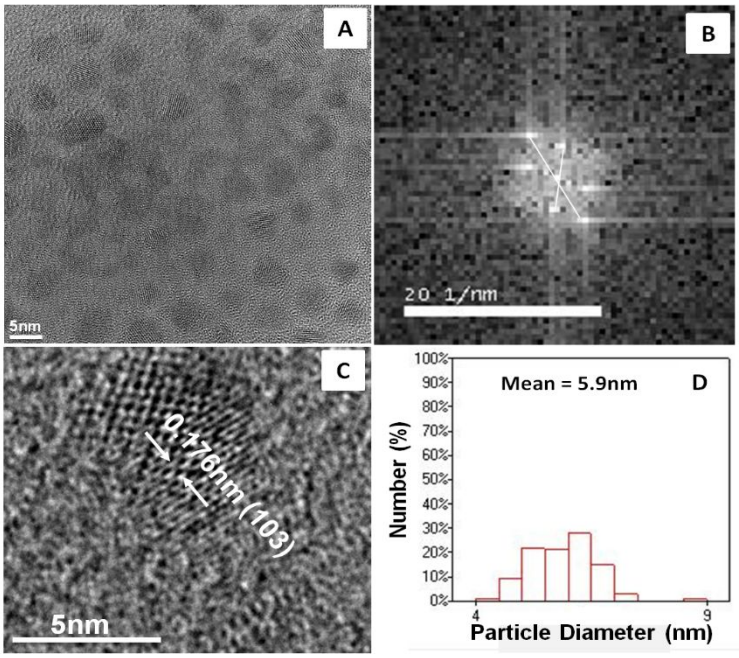

Figure S2. (A) HRTEM image; (B) FFT; (C) An enlarged HRTEM image and (D) Particle size distribution for ZnS:Mn nanocrystals with ligands (OAm+DDT).

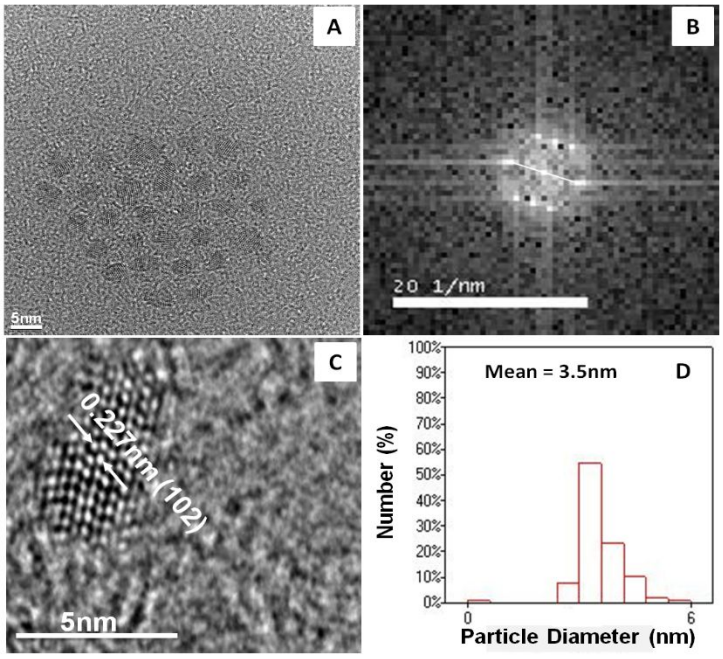

Figure S3. (A) TEM image; (B) FFT; (C) An enlarged HRTEM image and (D) Particle size distribution for ZnS:Mn nanocrystals with ligands (OAm+OAc).

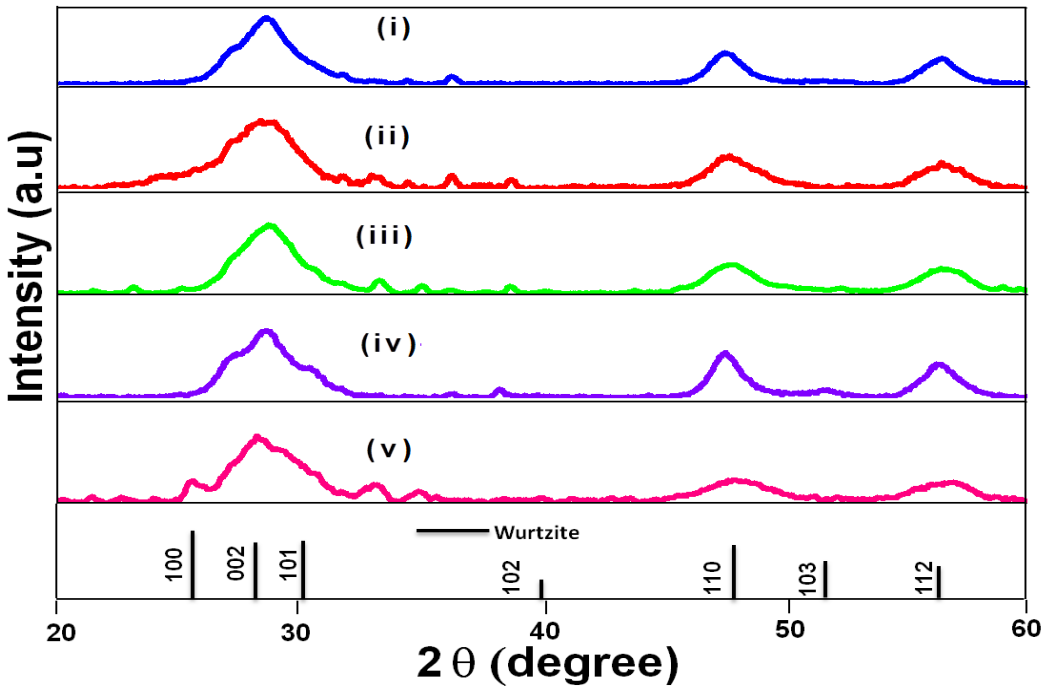

Figure S4. X-ray diffraction (XRD) patterns for ZnS:Mn nanocrystals with different dual ligands: Top panel: (i) OAm+DDT, (ii) OAm+OAc, (iii) OAm+SA, (iv) OAm+ODT and (v) OAm+ODA. Bottom panel: An enlarged version of (v).

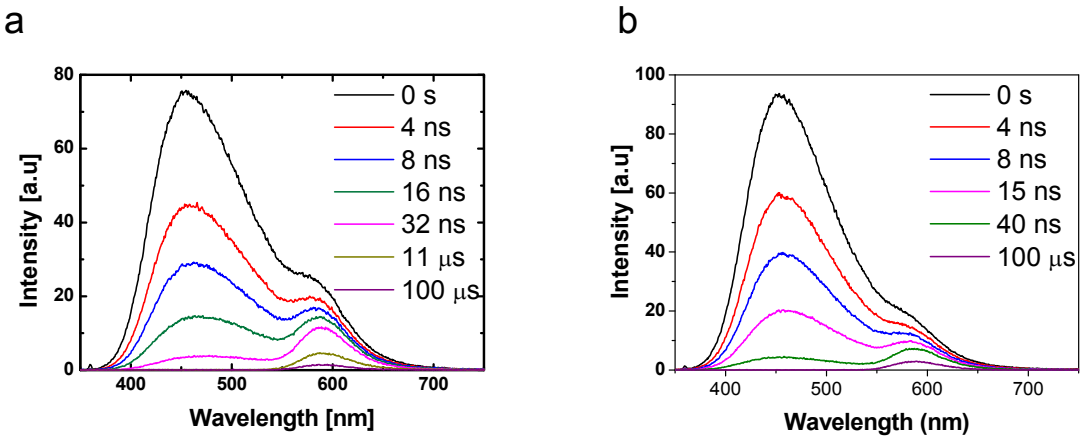

Figure S5. Time resolved emission spectra of two samples: OAm+ODA (a) and OAm+ODT (b). The samples were excited with a flash lamp pumped Q-switched Nd: YAG laser operating in third harmonic wavelength of 355 nm. The emission spectra were acquired for different time delays (0-10 ms) after the laser excitation.

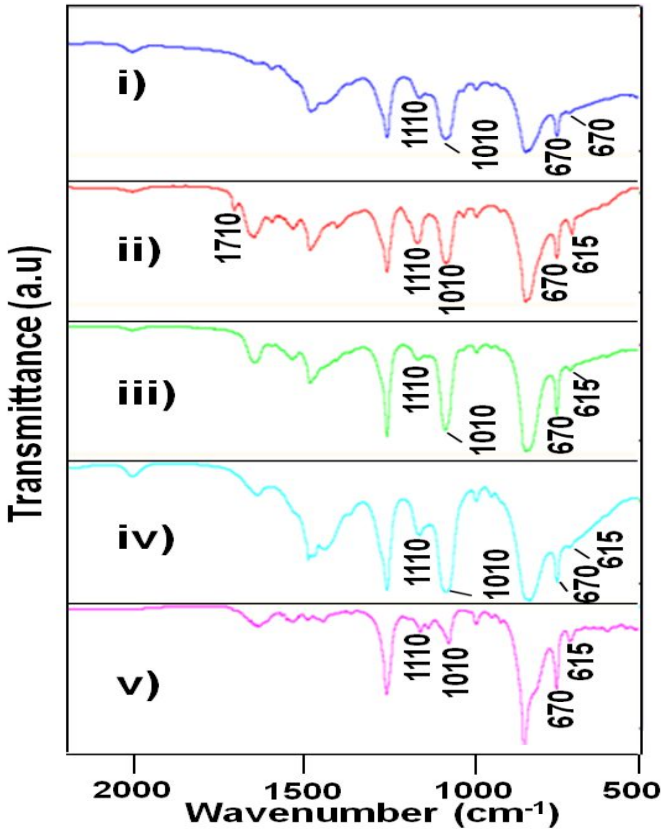

Figure S6. FTIR spectra of samples (OAm + L_2). (i) OAm+DDT, (ii) OAm+OAc, (iii) OAm+SA, (iv) OAm+ODT and (v) OAm+ODA.

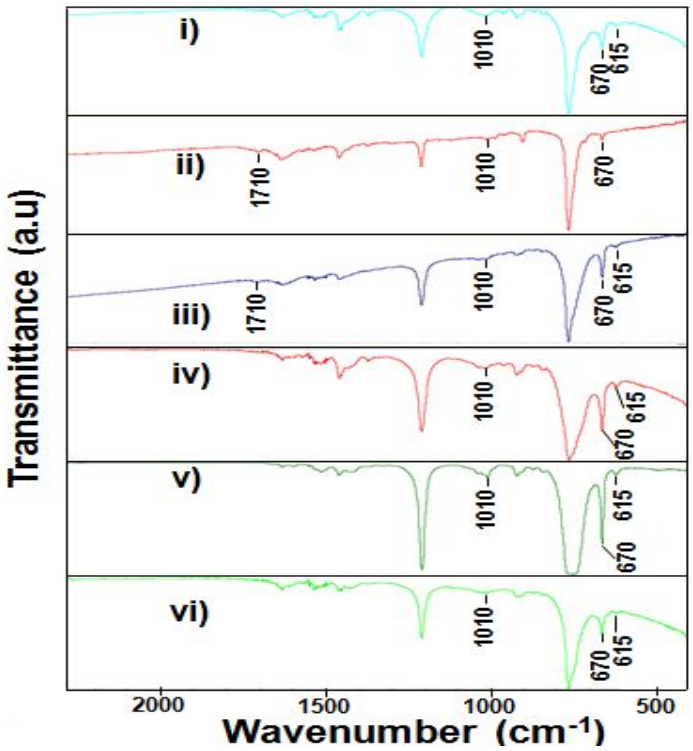

Figure S7. FTIR spectra of samples (ODE + L_2). (i) ODE+DDT, (ii) ODE+OAc, (iii) ODE+SA, (iv) ODE+ODT, (v) ODE+ODA and (vi) ODE+OAm.

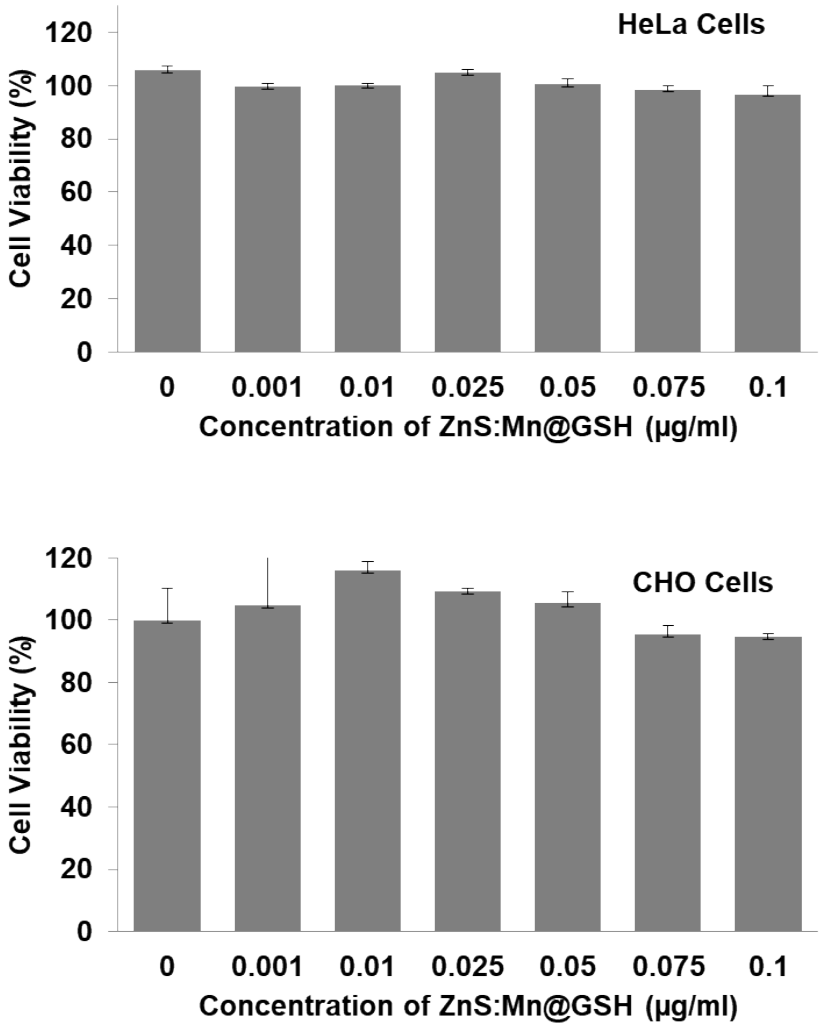

Figure S8. Cell viability of (A) HeLa and (B) CHO cells after 24 h of incubation with ZnS:Mn@GSH nanocrystals.

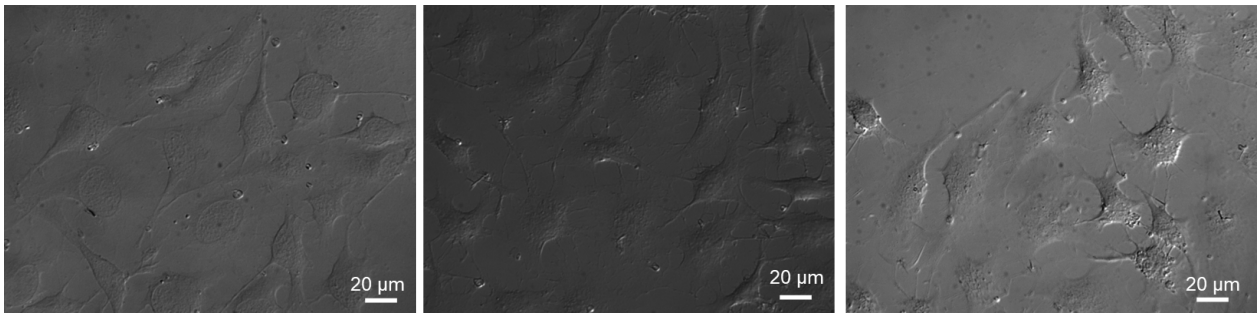

Figure S9. Transmission (DIC) images of control HeLa cells without treatment of nanocrystals.

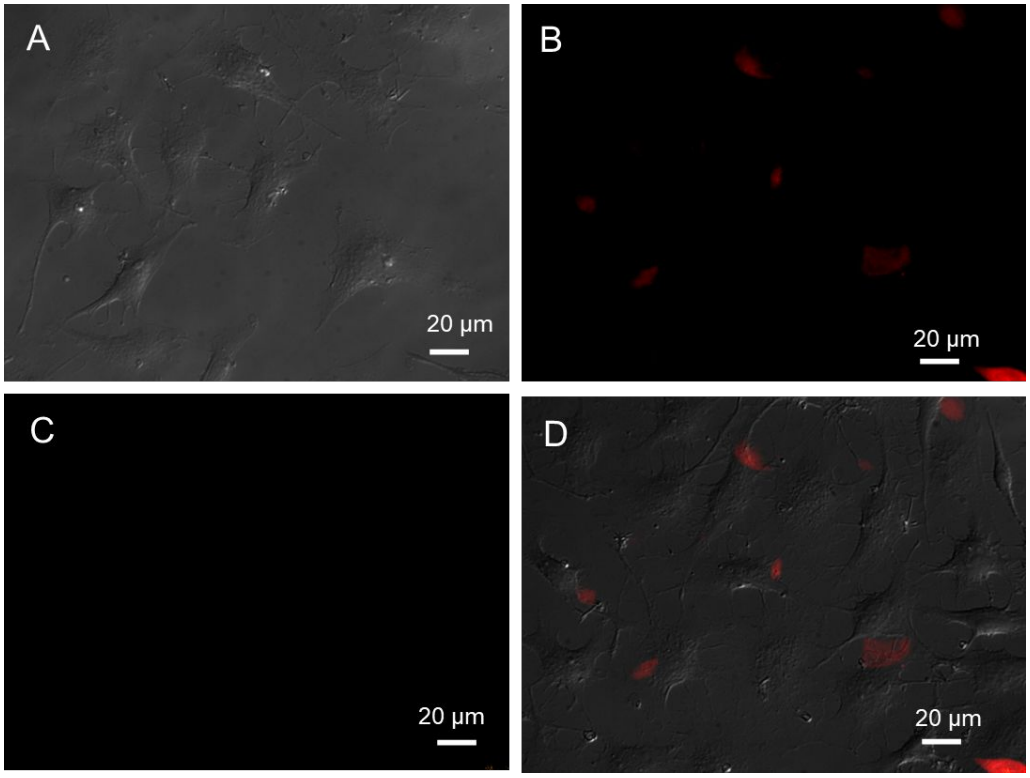

Figure S10. Labelling of HeLa cells without treatment of doped nanocrystals. (A) Transmission image in DIC channel, (B) fluorescence under RFP filter (C) fluorescence under 580 nm filter and (D) overlaid image. Scale bar: 20 μm.