Electronic Supplementary Information for:

One-pot synthesis of fluorescent hybrid nanoparticles and their assembly into transparent and multi-coloured nanofilms

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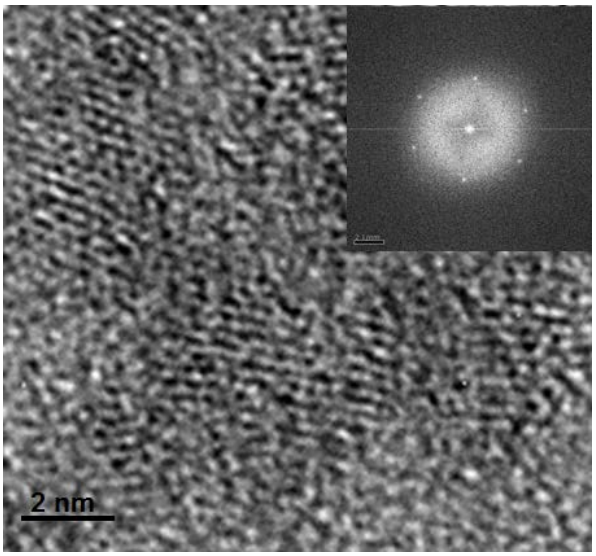

Figure S1. HRTEM image showing the lattice fringe of ZnS:Mn^{2+} (Ionic conc.: 0.25 M, Zn/Mn=18/2) nanocrystals produced in miniemulsion. Inset shows the corresponding selected area electron diffraction pattern.

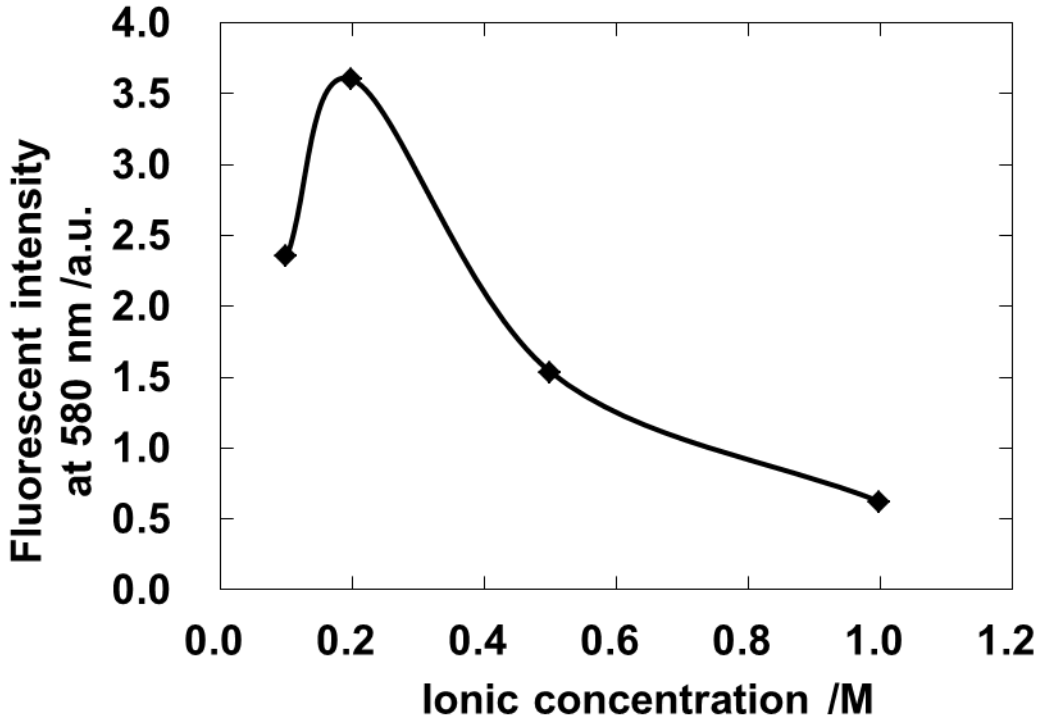

Figure S2. Influence of final concentration (Zn/Mn=18/2) on the maximum fluorescent intensity of nanocrystals produced in miniemulsion. The excitation wavelength was 280 nm.

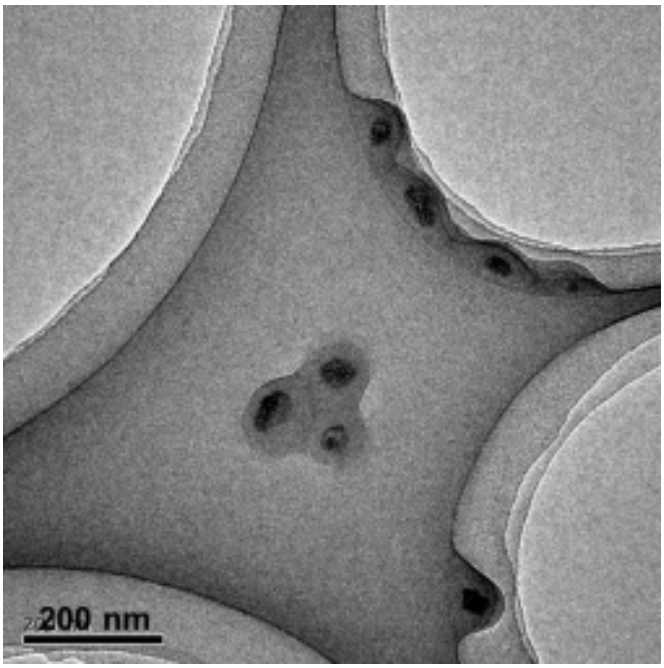

Figure S3. Transmission electron microscopic images (TEM) of ZnS:Mn^{2+} (Ionic conc.: 0.25 M, Zn/Mn=18/2) nanocrystals encapsulated inside PHEMA nanoparticles.. Nanoparticles were partially deformed during TEM observation due to electron beam illumination.

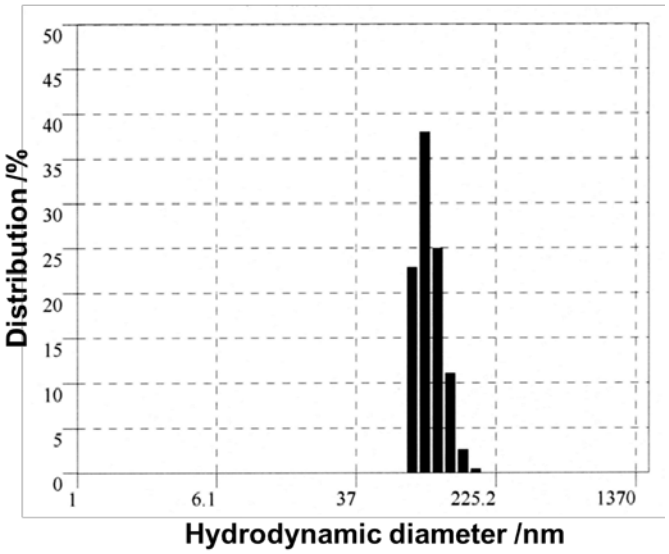

Figure S4. Size distribution of hydrodynamic diameters for ZnS:Mn^{2+}-encapsulated PHEMA nanoparticles (Ionic conc.: 0.25 M, Zn/Mn=18/2). The diameters were measured by dynamic light scattering.

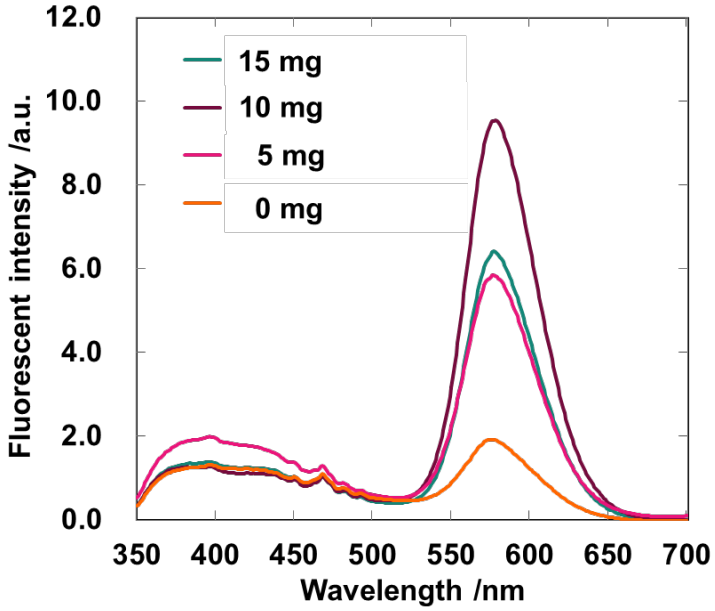

Figure S5. Fluorescence spectra of ZnS:Mn^{2+} nanocrystals encapsulated in PHEMA nanoparticles in the presence of different amounts of PMAc (Ionic conc.: 0.25 M, Zn/Mn=18/2). The excitation wavelength was 280 nm.

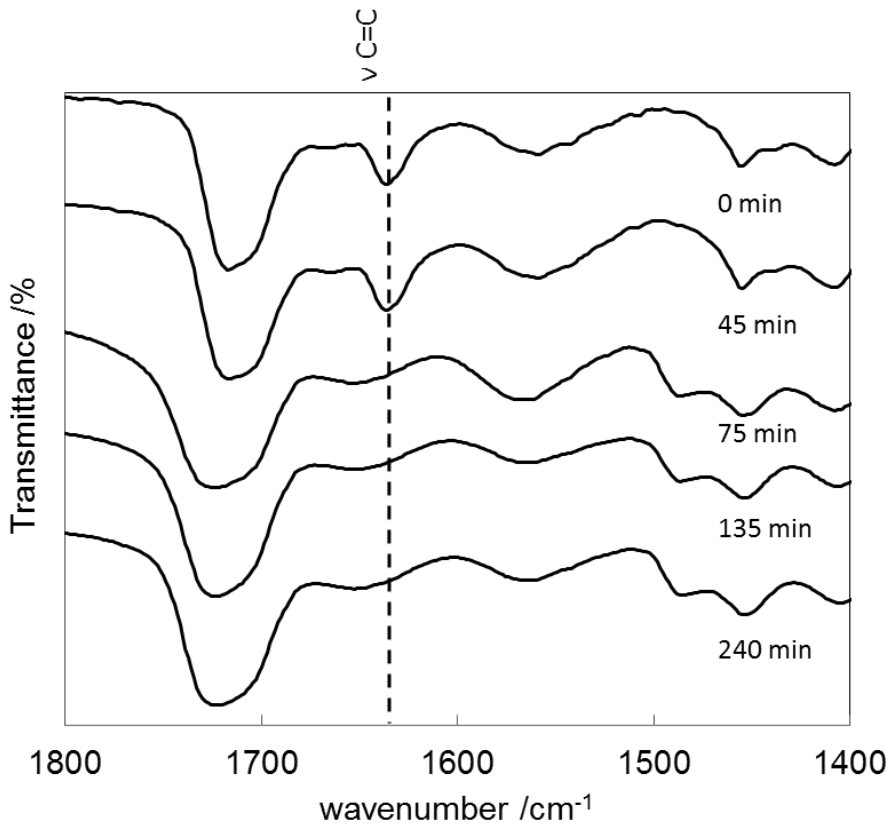

Figure S6. Change in infrared spectra for ZnS:Mn^{2+} nanocrystals-encapsulated hybrid nanoparticles (Ionic conc.: 0.25 M, Zn/Mn=18/2) with the polymerisation time (0, 45, 75, 135 and 240 min). A peak observed at around 1635 cm^{-1}, which is pointed out by the broken line, represents the C=C stretching mode of monomer, HEMA, and its intensity related to C=C decreases with increasing the polymerisation time, indicating that polymerisation of HEMA proceeded and the monomer conversion was almost complete at around 75 min.

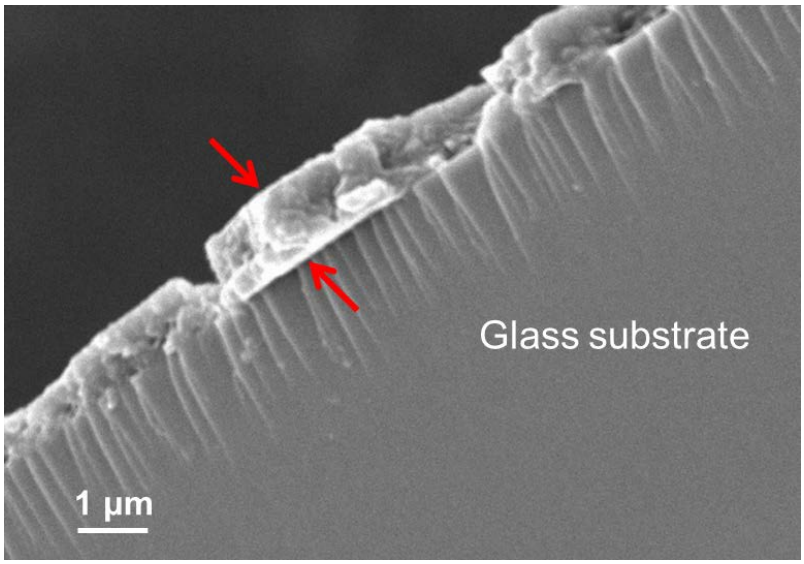

Figure S7. Scanning electron microscopic (SEM) image for a cross-section of a hybrid nanofilm indicated as red arrows. Spin-coating was carried out 10 times to prepare hybrid nanoparticles over a glass substrate. The average thickness of 10 layers of hybrid nanofilm was measured to be 1.10 ±0.12 μm. Therefore, the thickness per layer can be estimated as approximately 110 nm, which is consistent with the size of single nanoparticle.

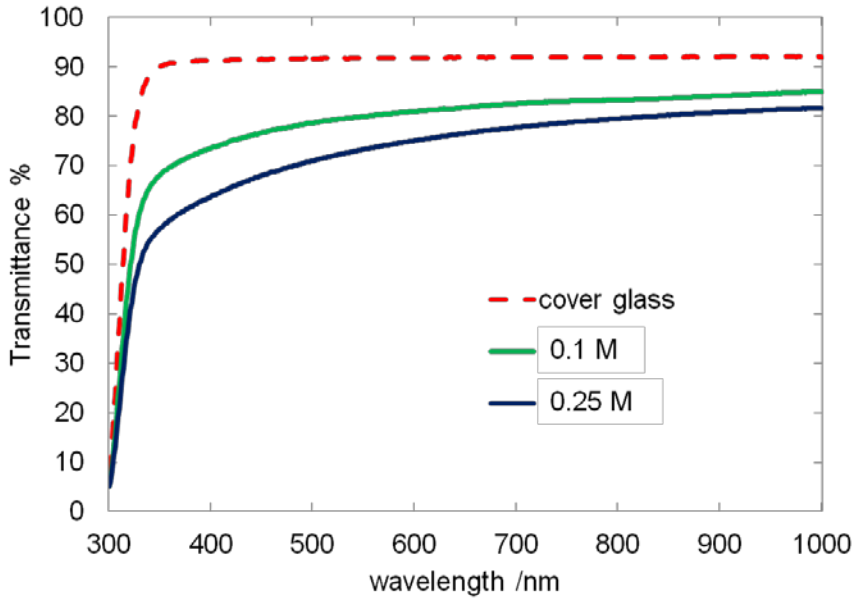

Figure S8. UV-VIS transmittance of a cover glass (red) and hybrid nanofilms produced by spin-coating of hybrid nanoparticles over the cover glass. Each nanofilm contains nanocrystals produced at ionic concentration of 0.1 M (green) and 0.25 M (blue).