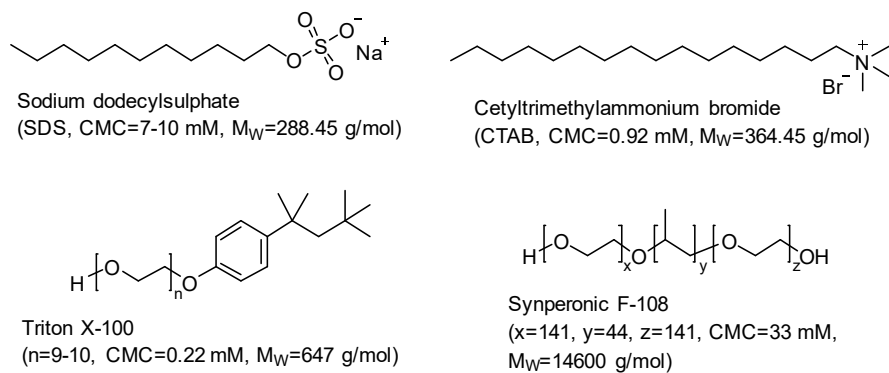
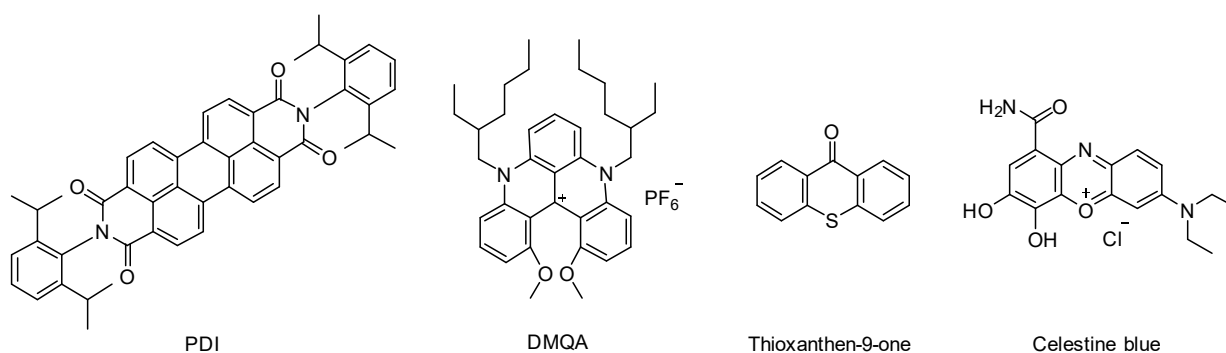


Synthesis of Fluorescent Polystyrene Nanoparticles: A Reproducible and Scalable Method

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Scheme S1. Information of the surfactants used to make PS NPs.



Scheme S2. Structures of the model hydrophobic dyes incorporated into the PS NPs.

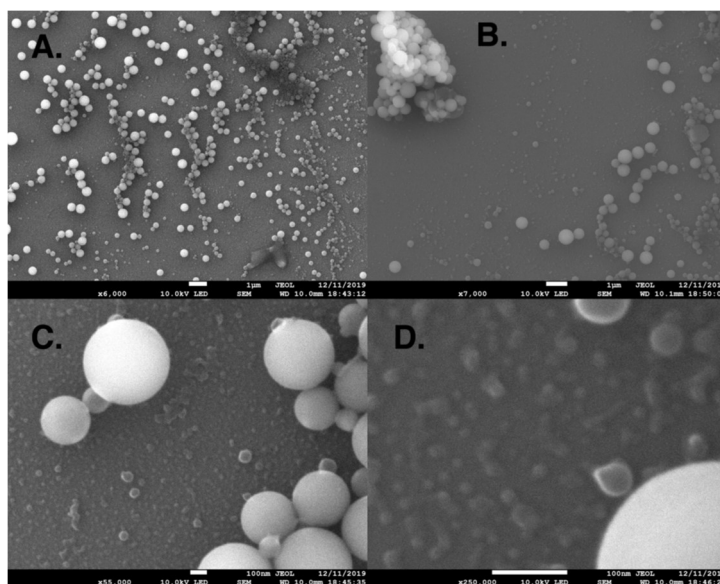


Figure S1. SEM images of PDI loaded PS NPs with SDS concentration of 0.001 mg/ml at different magnification levels (scale bar, AB, 1 μ m; CD, 100 nm).

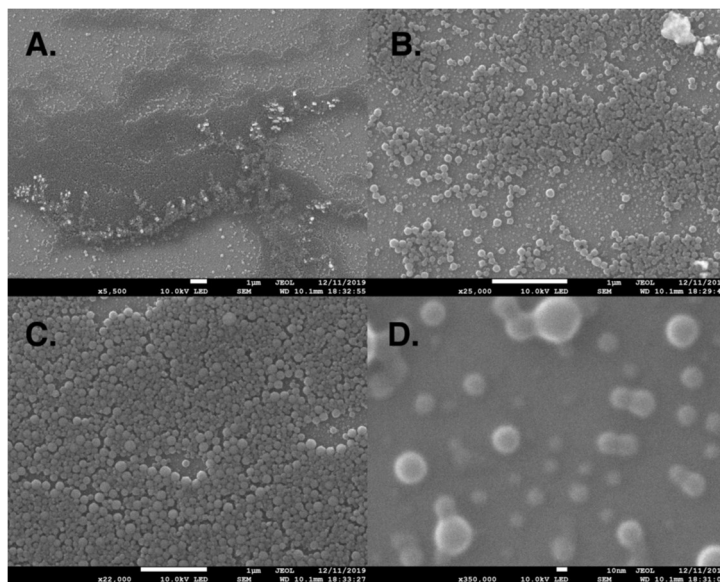


Figure S2. SEM images of PDI loaded PS NPs with SDS concentration of 0.5 mg/ml at different magnification levels (scale bar, ABC, 1μm; D, 10 nm)

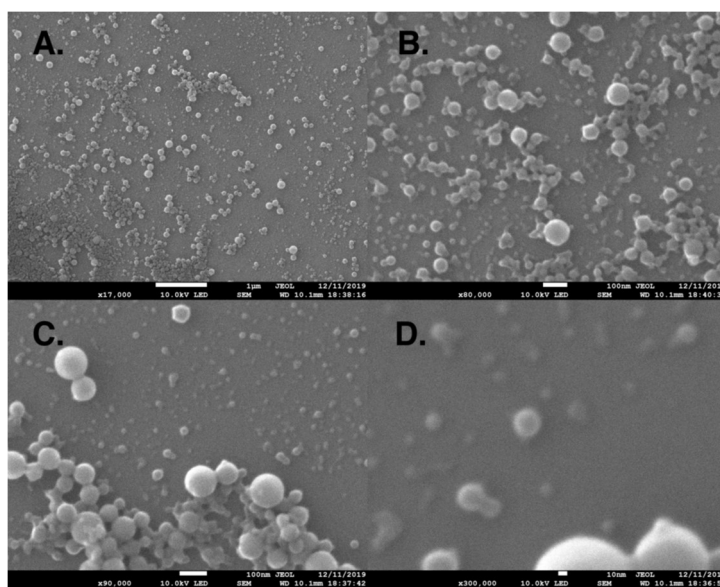


Figure S3. SEM images of PDI loaded PS NPs with SDS concentration of 1 mg/ml at different magnification levels (scale bar, A, 1μm; BC, 100 nm; D, 10nm).

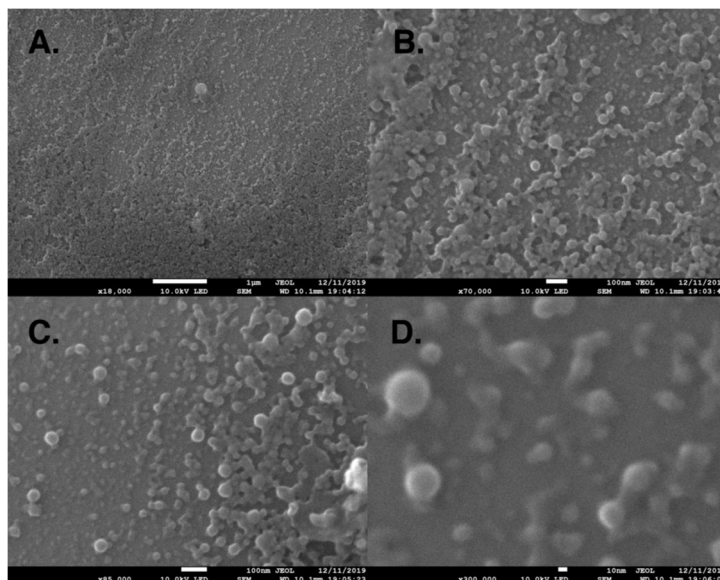


Figure S4. SEM images of PDI loaded PS NPs with SDS concentration of 20 mg/ml at different magnification levels (scale bar, A, 1 μ m; BC, 100 nm; D, 10nm).

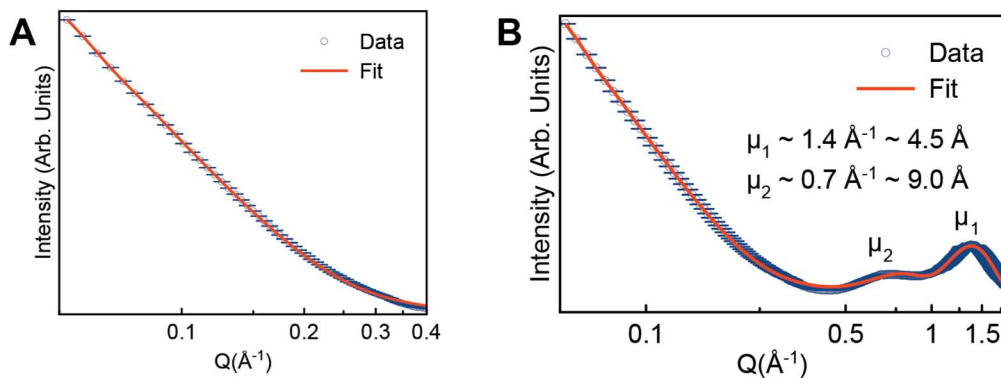


Figure S5. A) The fit with a spherical SAXS form factor using a lognormal polydispersity and a power law in the Q-range = [0.05; 0.4] with a radius of $r = 10.75$ nm ($\mu = 10.75 \pm 0.13$ nm and $\sigma = 0.1489 \pm 0.0024$ nm). B) The fit in the higher Q-regime with 2 peaks present representing frequent distances in the structure. These can be fitted with 2 Gaussian distributions with mean of approx. 0.7 and 1.4 \AA^{-1} which correspond to distances in the structure of 4.5 \AA and 9.0 \AA .

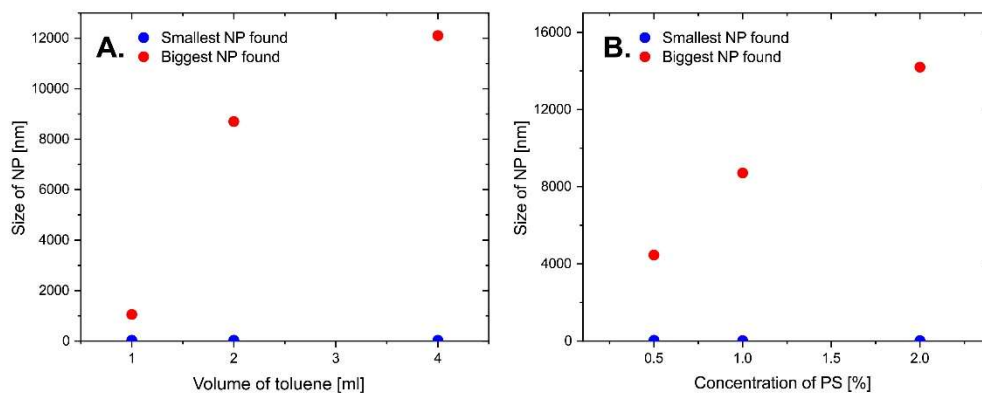


Figure S6. Largest and smallest NPs sizes as functions of using various amounts of A) toluene and B) polystyrene. PS NPs were prepared according to the standard protocol with the surfactant Triton X-100 (1.08 mg/ml) in 14 mL of water and 17.3 mg of PS (Mw 35,000) in corresponding volume of toluene for A or PS (Mw 35,000) 0.5%, 1%, 2% w/w% in 2 mL of toluene for B.

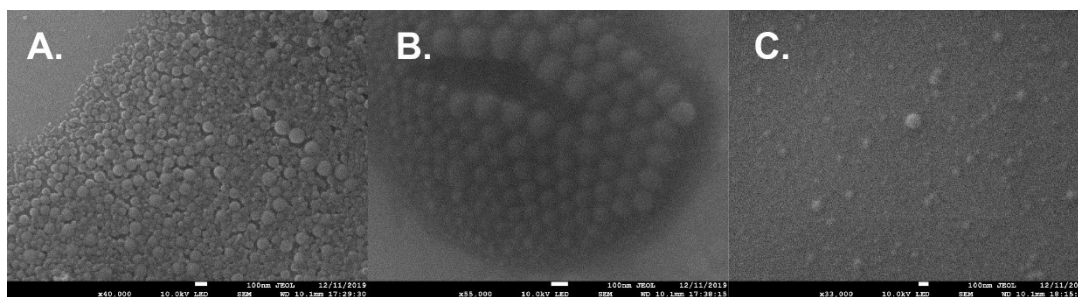


Figure S7. SEM images for the PS NPs prepared with surfactants A) CTAB, B) Triton X-100, and C) Synperonic F-108 with concentration of 1.73 mM (scale bar, 100 nm).

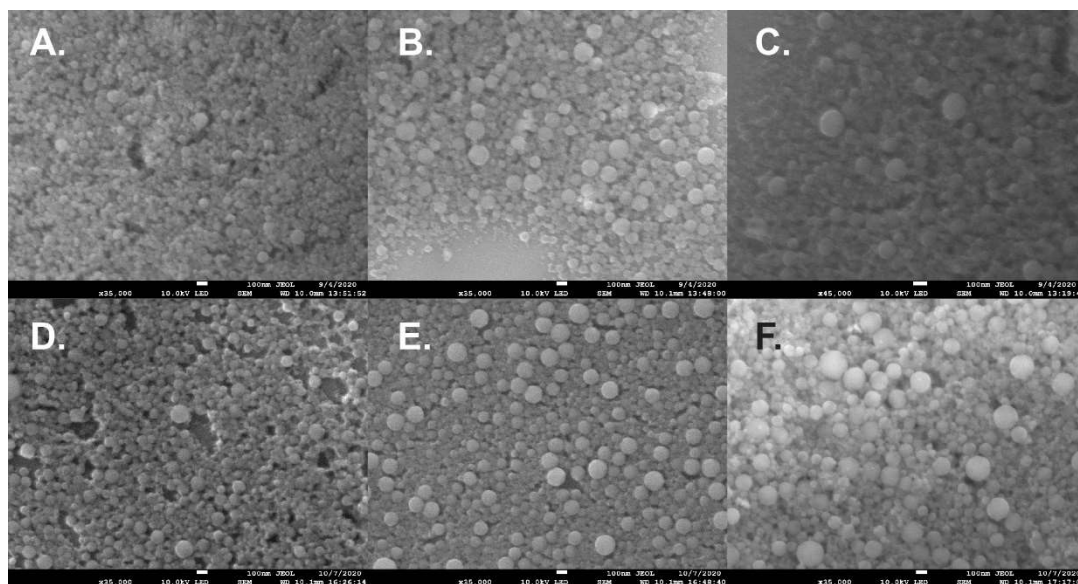


Figure S8. SEM images for the PS NPs prepared with PS with molecular weight AD) 35,000, BE) 280,000, and CF) 350,000 (scale bar, 100 nm).

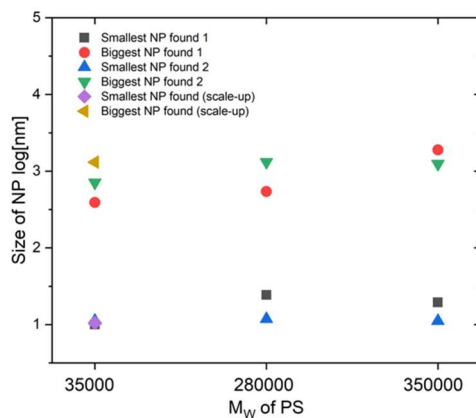


Figure S9. The biggest and the smallest PS NPs observed with SEM for PS NPs prepared with PS with molecular weight 35,000, 280,000, and 350,000, and 2 batches for each. The biggest and the smallest PS NPs for the 5 times scale-up sample was also shown here with yellow and purple markers.

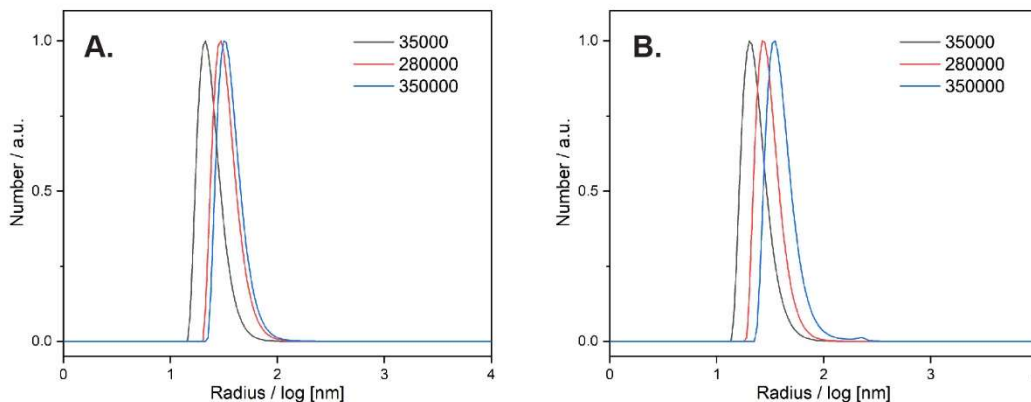


Figure S10. DLS results for the size distribution for the PS NPs prepared with different PSs (Mw 35,000, 280,000, 350,000). PS NPs were prepared according to the standard protocol with PS 1% in 2 mL toluene and 1 mg/mL SDS in 14 mL water. The mean position of peaks are respectively 23.96, 33.75 and 36.90 nm for one batches A) and another batches B) 23.53, 31.19, 40.61 nm

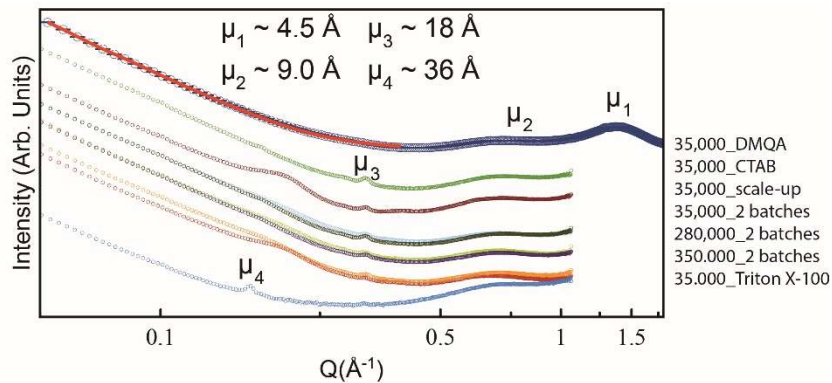


Figure S11. SAXS results for different batches of PS NPs as labeled to the right.

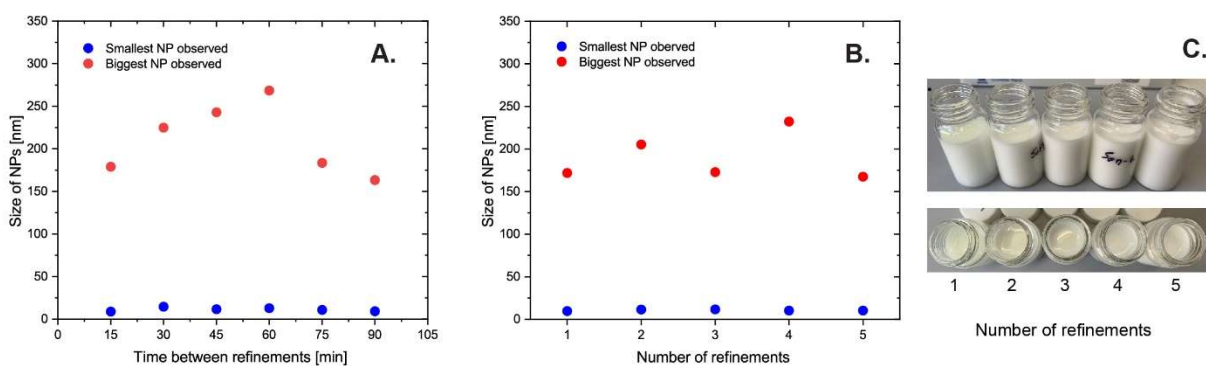


Figure S12. The largest and the smallest PS NPs observed with SEM for samples prepared with the same amount of each ingredient (PS Mw, 35,000 1% in 2 mL toluene and 0.1 mg/mL SDS in 14 mL water) but with different A) durations between refinements or B) number of refinements. C) Photos of the PS NPs solution obtained after different refinement cycles.

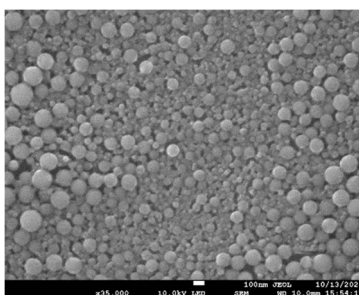


Figure S13. SEM image for the 5 times scale-up PS NPs batch (PS Mw, 35,000 1% in 10 mL toluene; 0.1 mg/mL SDS in 70 mL water; with standard refinement method).

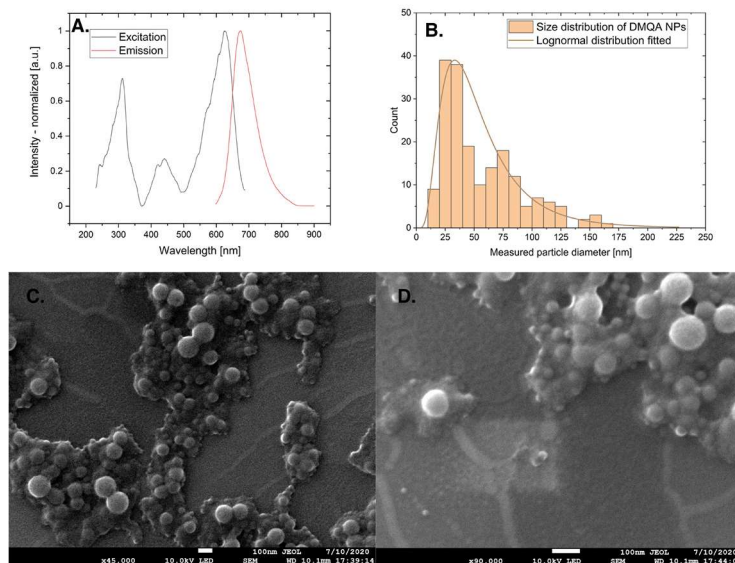


Figure S14. A) Excitation and emission spectra (normalized at Ex. 635 nm and Em. 692 nm), B) size distribution counted from SEM image C (n=187, bin size 10 nm) and CD) SEM images for PS NPs loaded with DMQA.

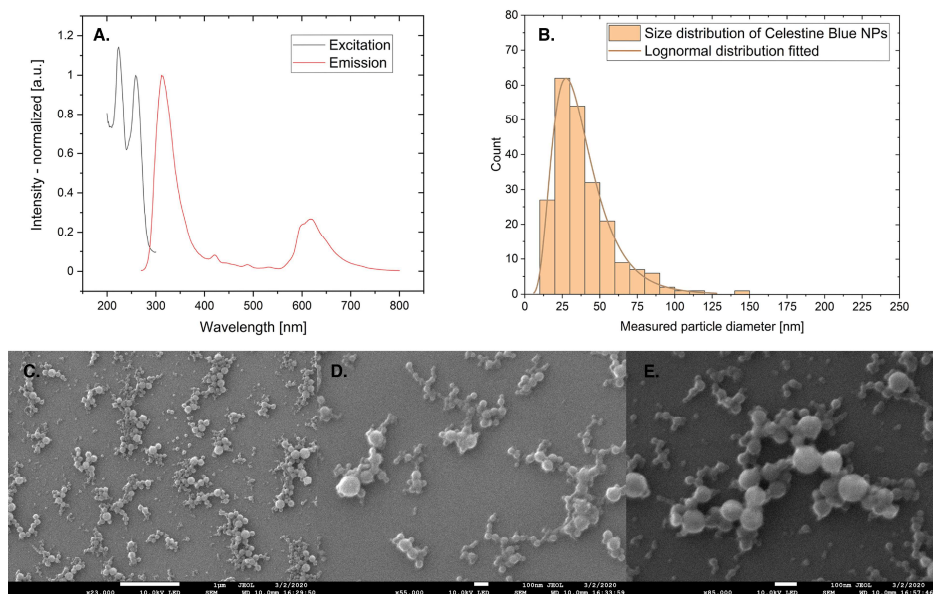


Figure S15. A) Excitation and emission spectra (normalized at Ex. 265 nm and Em. 322 nm), B) size distribution counted from the SEM image D (n=225, bin size 10 nm) and CDE) SEM images for PS NPs loaded with celestine blue.

