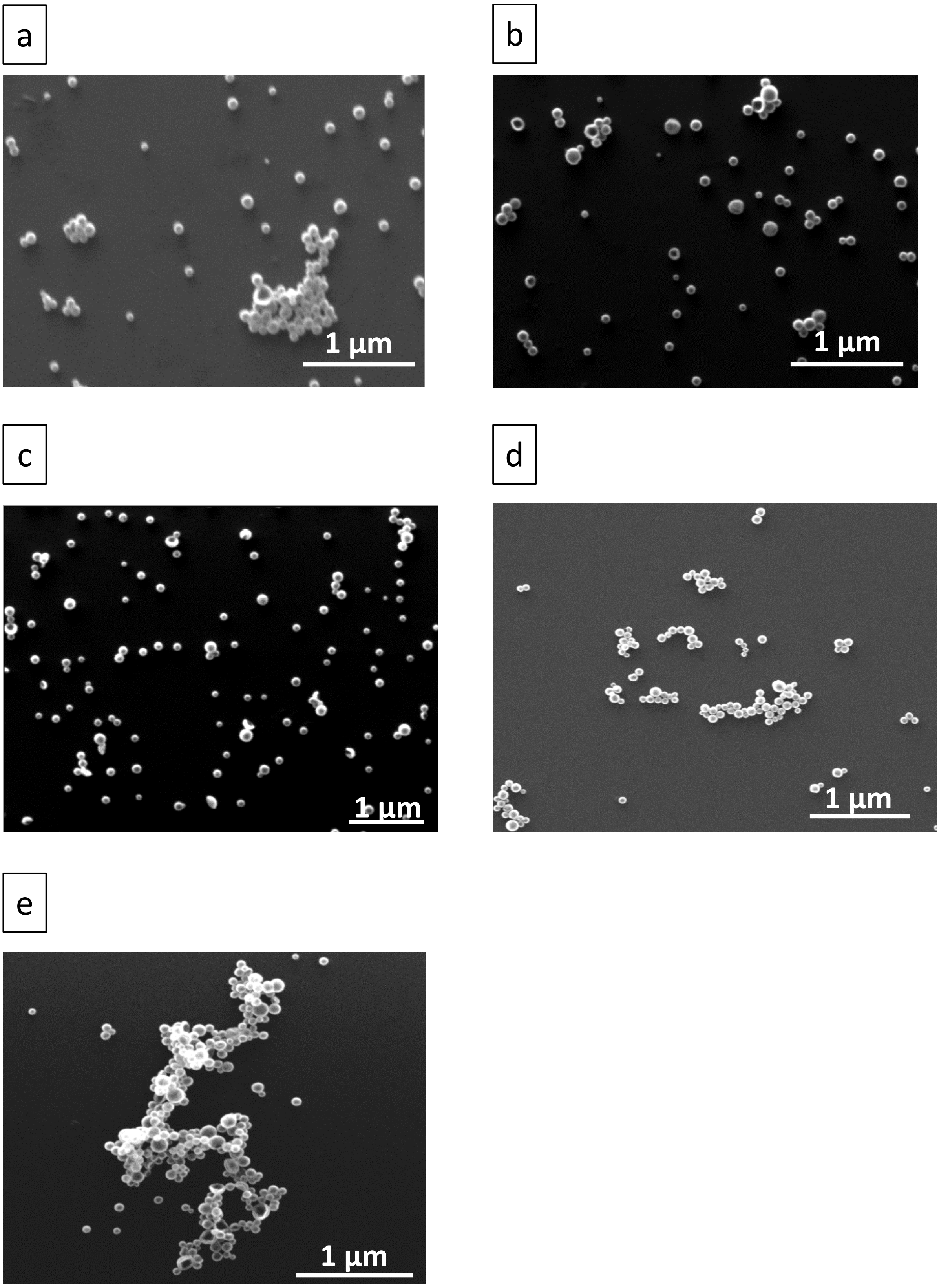

Figure S 1: SEM images corresponding to extinction spectra in Figure 1, (a) PVP-stabilised HGNs, (b) PAM-stabilised HGNs, (c) thioglucose-stabilised HGNs, (d) silica-stabilised HGNs, and (e) dextran-stabilised HGNs.

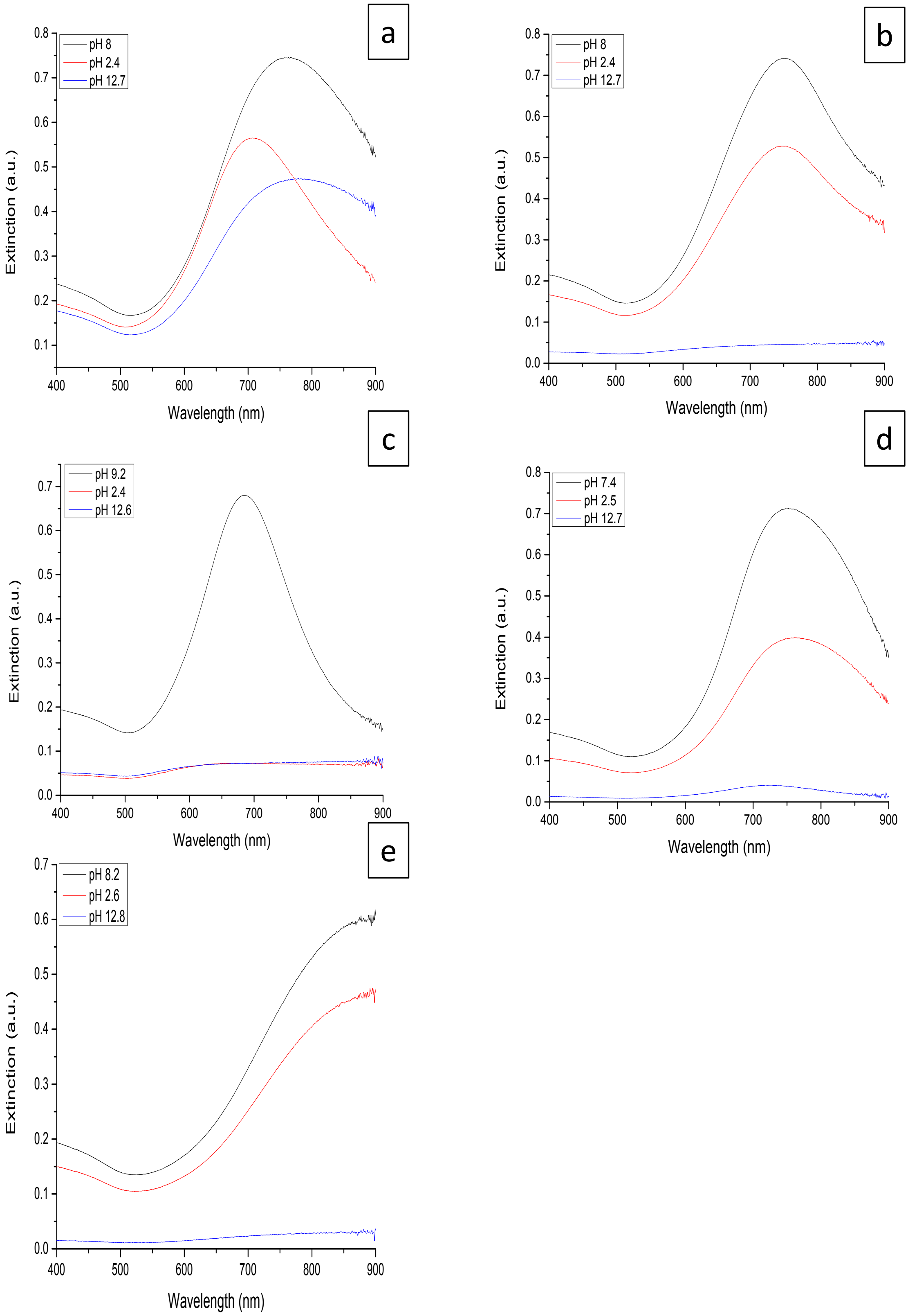

Figure S 2: Extinction spectra of (a) PAM-stabilised HGNs, (b) PVP-stabilised HGNs, (c) silica-stabilised HGNs, (d) dextran-stabilised HGNs and (e) thioglucose-stabilised HGNs measured at original pH (black), acidic pH (red) and alkaline pH (blue).

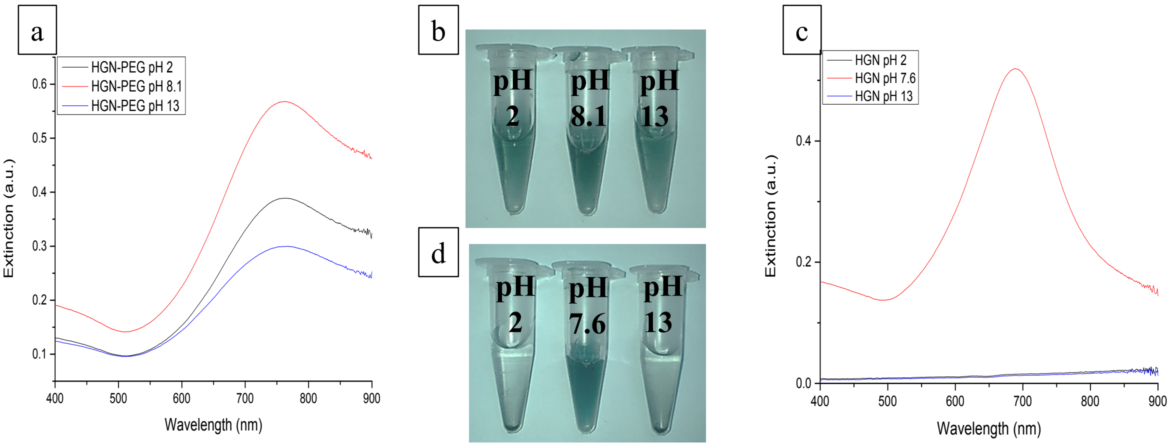

Figure S 3: (a) Extinction spectra of PEG-stabilised HGNs after 24hrs suspended in different pH values, (b) image of PEG-HGNs in a range of pH environments, (c) image of citrate-stabilised HGNs in a range of pH environments and (d) extinction specrta of citrate-stabilised HGNs after 24hrs suspended in differnet pH values.

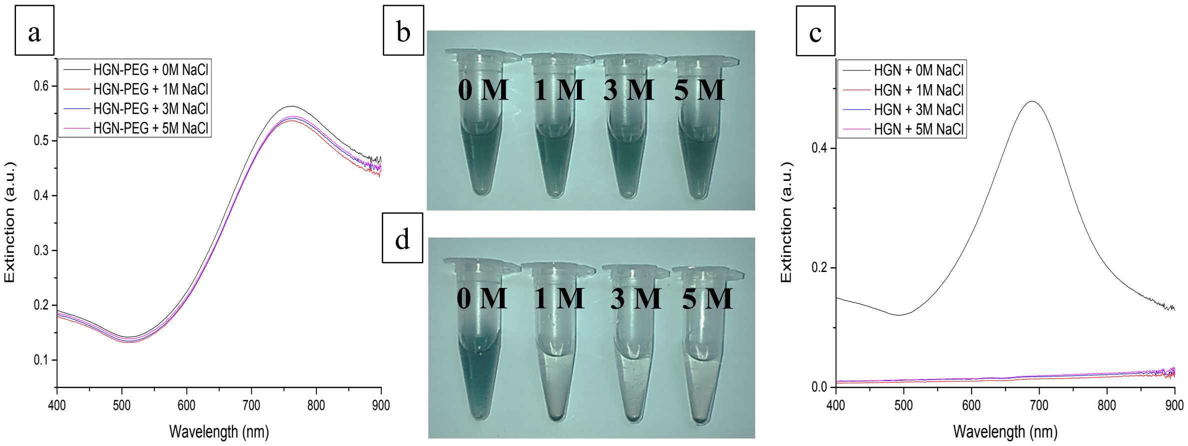

Figure S 4: (a) Extinction spectra of PEG-stabilised HGNs after 24hrs suspended in increasing NaCl concentrations, (b) image of PEG-HGNs in increasing salt concentrations from left to right, (c) image of citrate-stabilised HGNs in increasing salt concentrations from left to right, and (d) extinction specta of citrate-stabilised HGNs after 24hrs suspended in increasing NaCl concentrations.

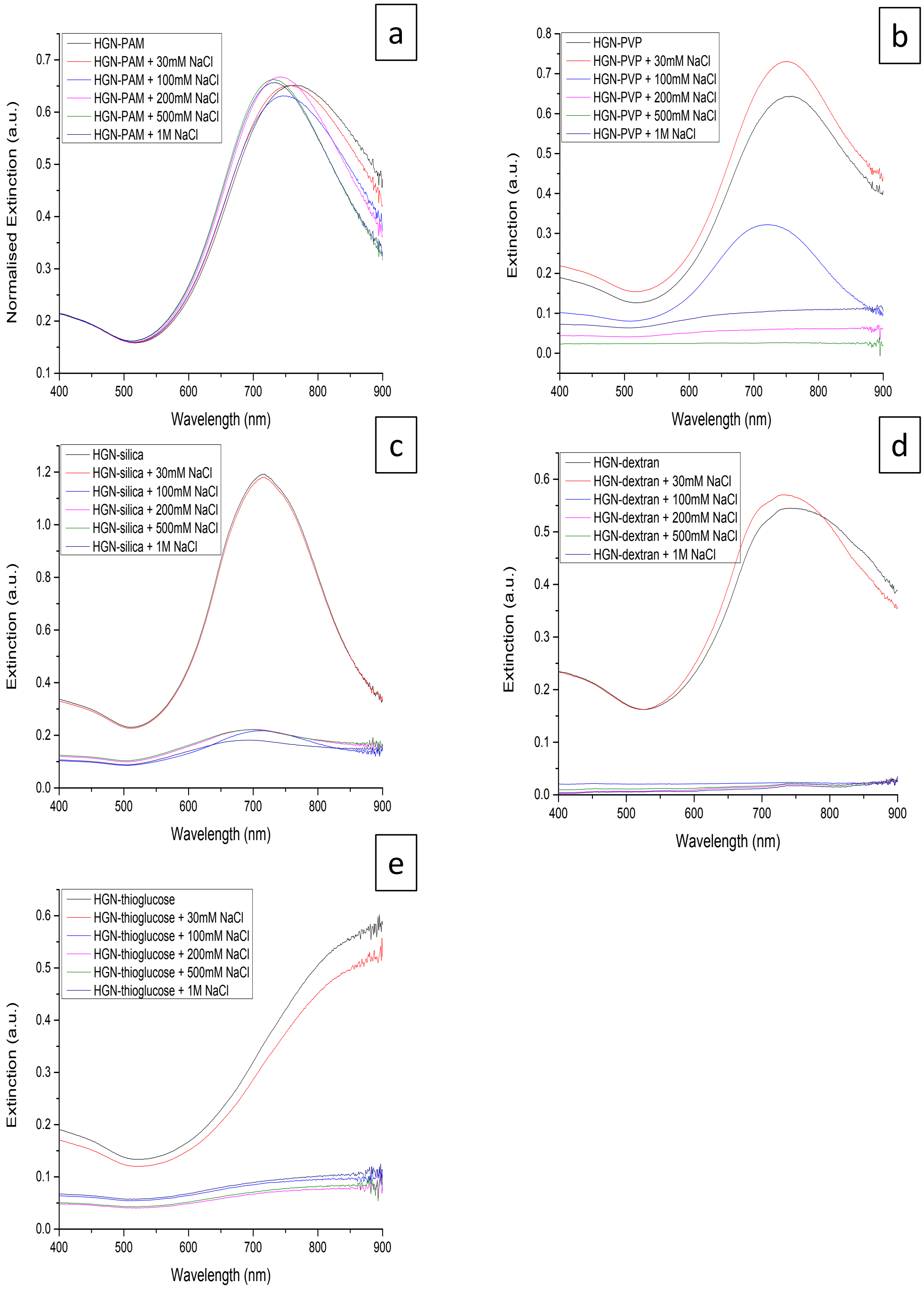

Figure S 5: Extinction spectra of (a) PAM-stabilised HGNs, (b) PVP-stabilised HGNs, (c) silica-stabilised HGNs, (d) dextran-stabilised HGNs and (e) thioglucose-stabilised HGNs measured after dispersion in various different salt solutions of increasing concentration.

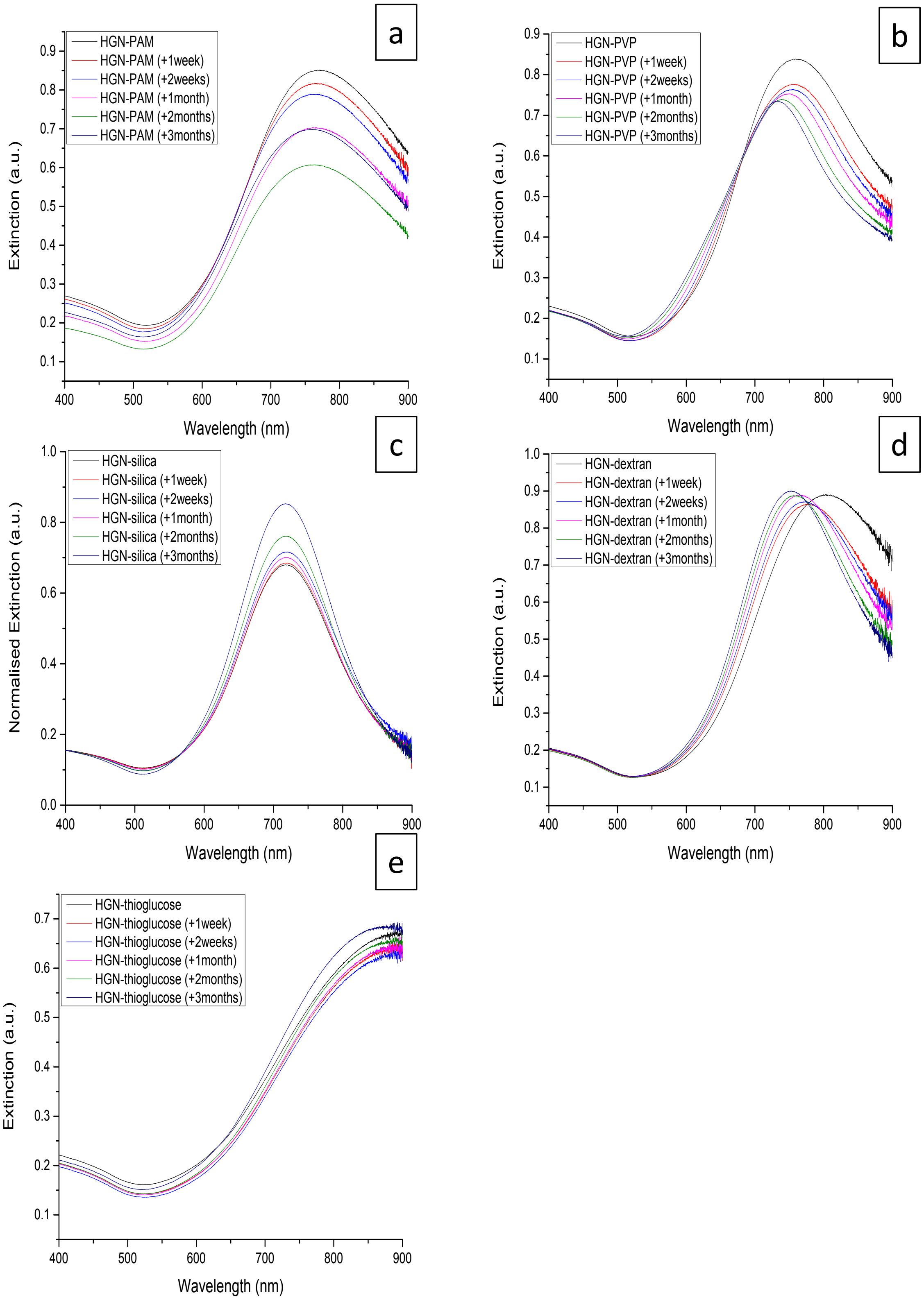

Figure S 6: Extinction spectra of (a) PAM-stabilised HGNs, (b) PVP-stabilised HGNs, (c) silica-stabilised HGNs, (d) dextran-stabilised HGNs and (e) thioglucose-stabilised HGNs measured at specific time intervals after initial synthesis.

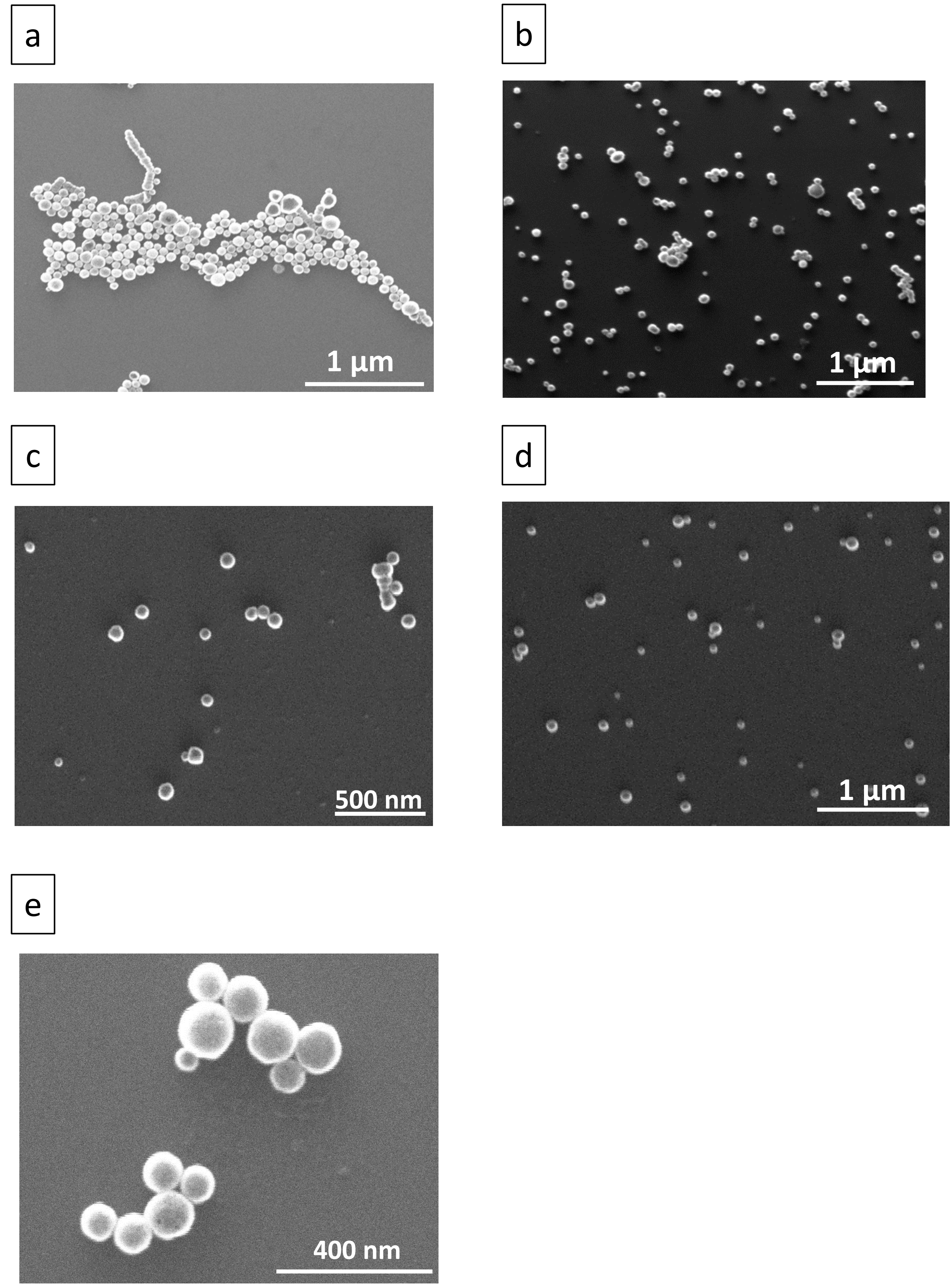

Figure S 7: SEM images corresponding to extinction spectra in Figure S4 of (a) PAM-stabilised HGNs, (b) PVP-stabilised HGNs, (c) silica-stabilised HGNs, (d) dextran-stabilised HGNs and (e) thioglucose-stabilised HGNs taken three months after initial synthesis.

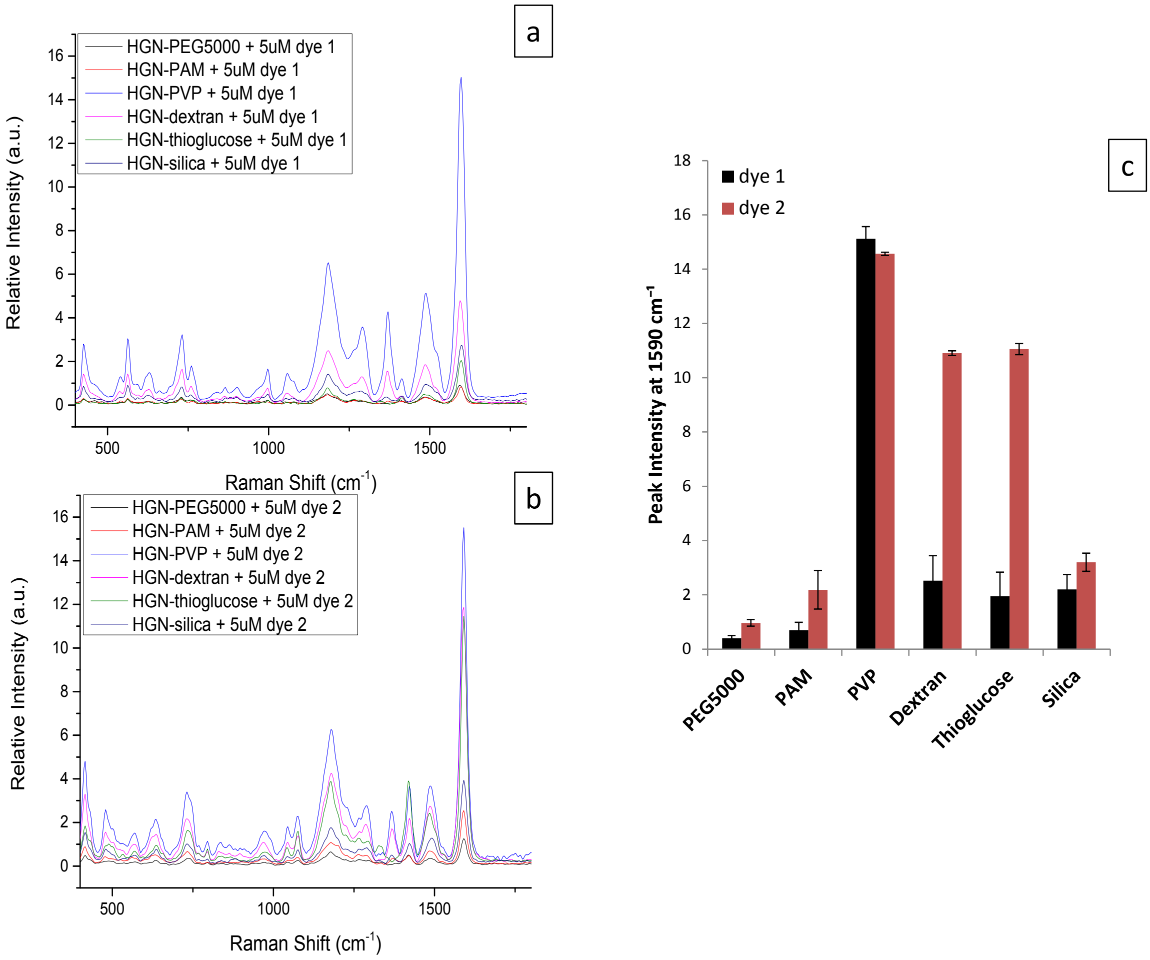

Figure S 8: SERS spectra recorded using an excitation wavelength of 1064 nm: (a) SERS spectra of dye 1 for all stabilised HGNs; (b) SERS spectra of dye 2 for all stabilised HGNs; (c) SERS peak intensities at 1590 cm^{-1} for both reporters at 5 uM final concentration. Spectra were obtained by scanning 3 replicates of each sample with 20 scans averaged per sample under a laser incident power of 600 mW. Averages are shown and error bars are ± one standard deviation.

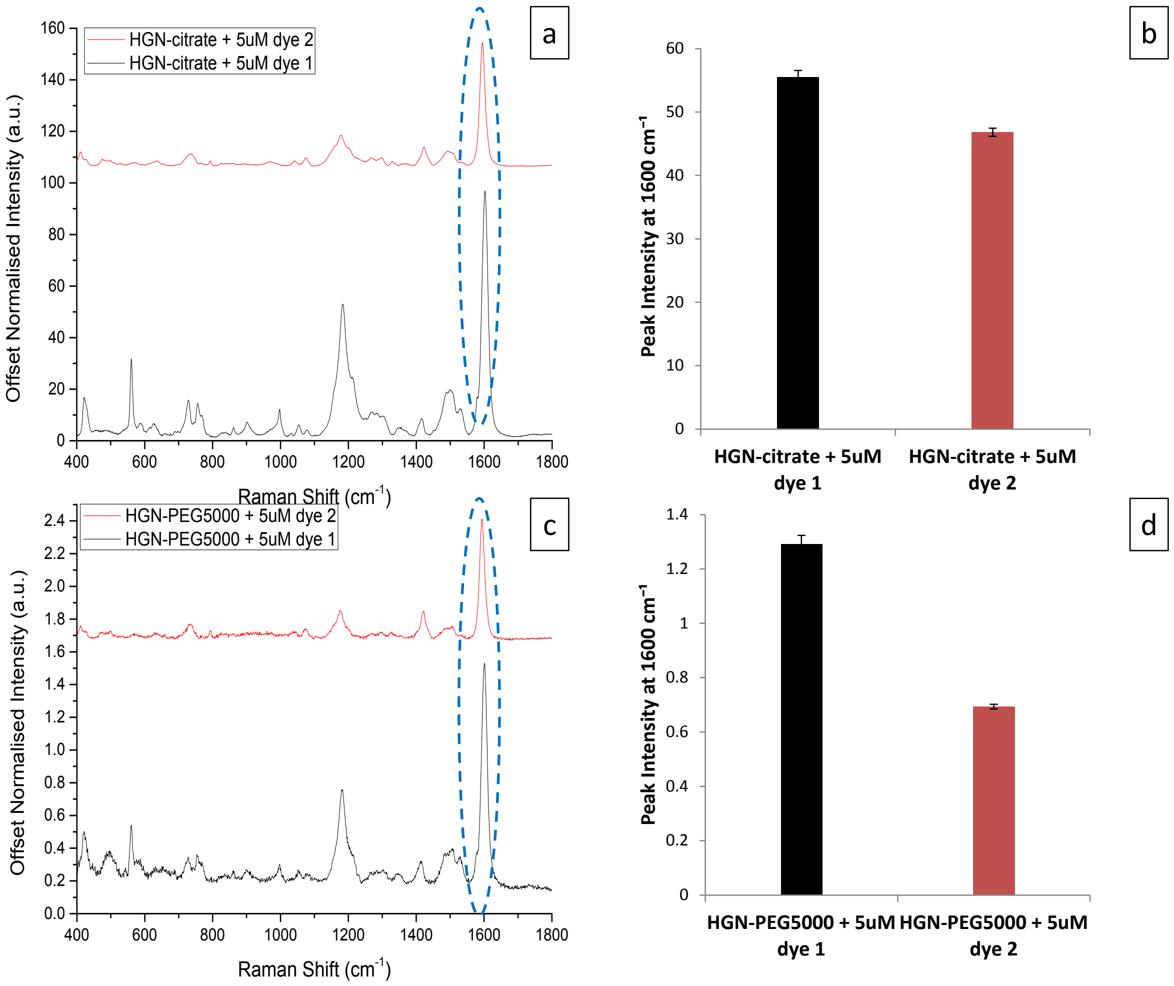

Figure S 9: SERS spectra recorded using an excitation wavelength of 785 nm: (a) SERS spectra of dye 2 (red) and dye 1 (black) using standard citrate-HGNs; (b) SERS peak intensities at 1600 cm^{-1} for both reporters at 5 uM final concentration; (c) SERS spectra of dye 2 (red) and dye 1 (black) using PEG-stabilised HGNs; (d) SERS peak intensities at 1600 cm^{-1} for both reporters at 5 uM final concentration. Spectra were obtained by scanning 3 replicates of each sample with a 10s accumulation time. Averages are shown and error bars are ± one standard deviation.

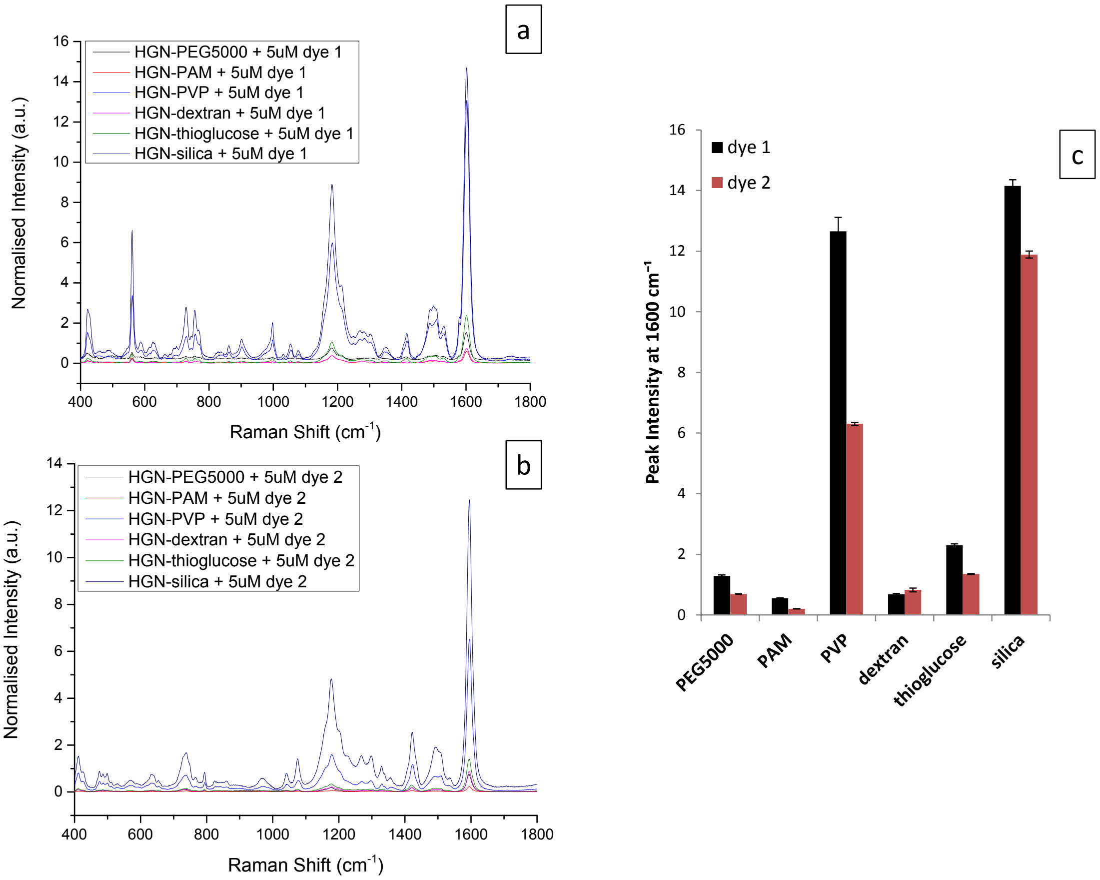

Figure S 10: SERS spectra recorded using an excitation wavelength of 785 nm: (a) SERS spectra of dye 1for all stabilised HGNs; (b) SERS spectra of dye 2 for all stabilised HGNs; (c) SERS peak intensities at 1600 cm^{-1} for both reporters at 5 uM final concentration. Spectra were obtained by scanning 3 replicates of each sample with a 10s accumulation time. Averages are shown and error bars are ± one standard deviation.