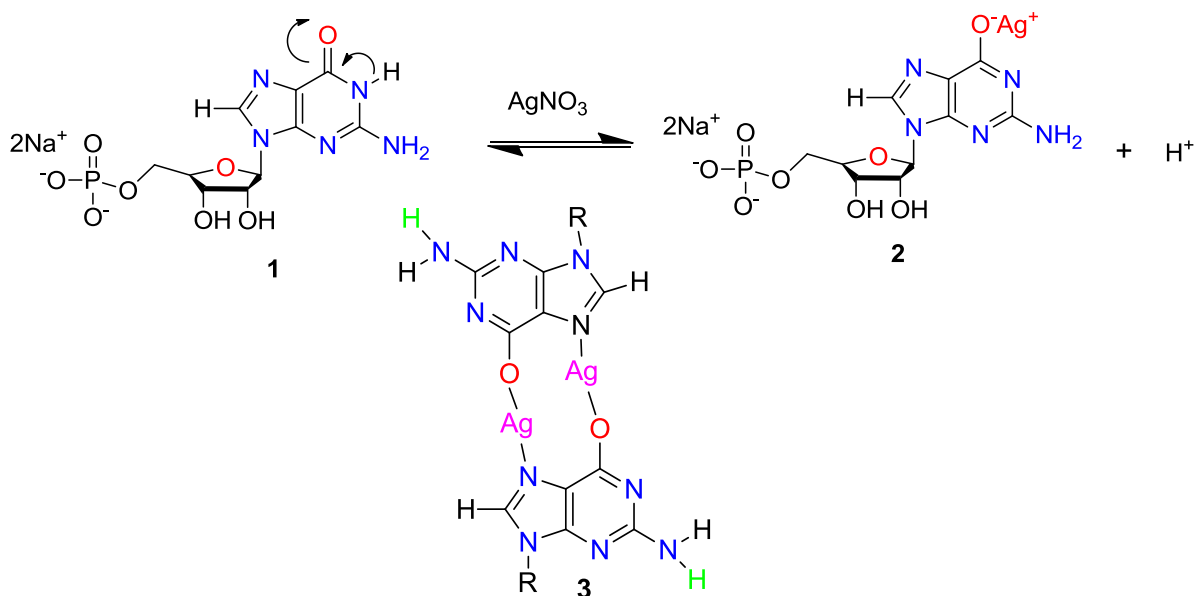


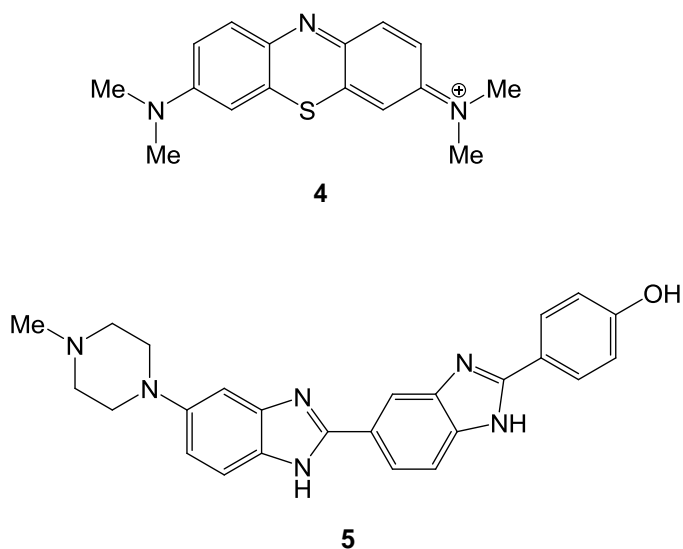
## Supramolecular hydrogels derived from silver ion-mediated self-assembly of 5'-guanosine monophosphate†

Jyotirmayee Dash, Avinash J. Patil, Rabindra Nath Das, Fern L. Dowdall and Stephen Mann\*

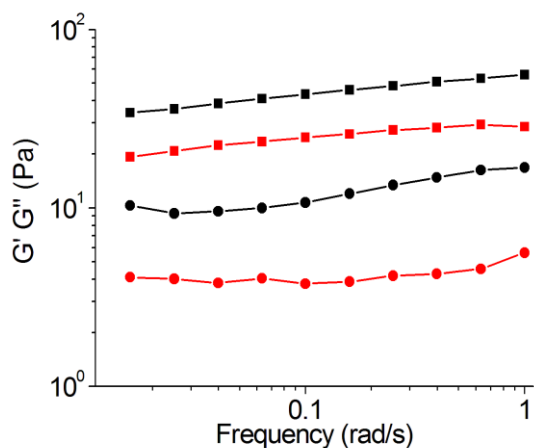
### Supplementary Information



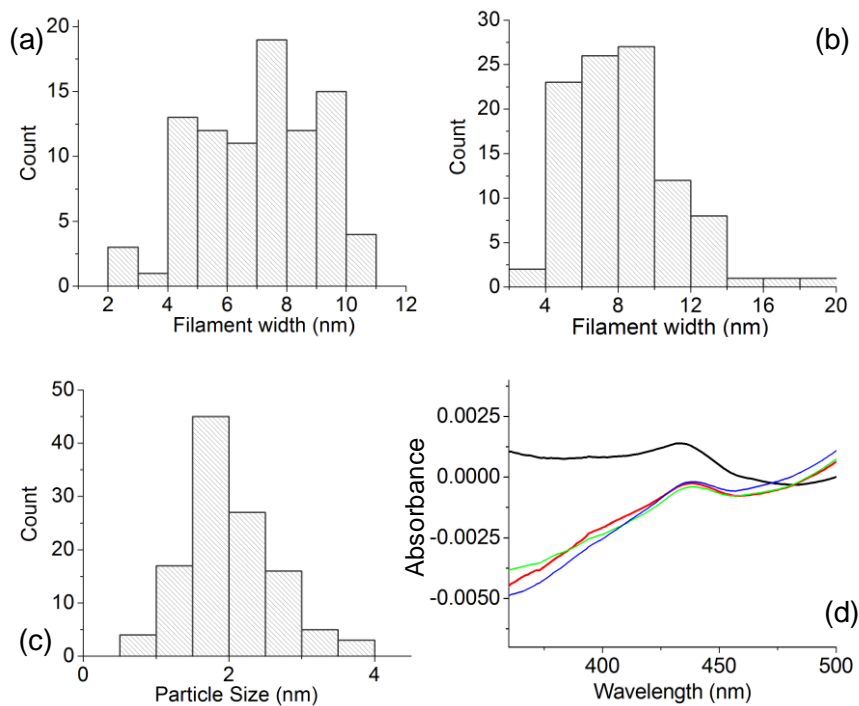
**Scheme 1** Addition of Ag<sup>+</sup> ions to GMP (1) produces an enolate tautomer (2) and release of a proton from N1, and subsequent formation of a Ag-GMP dimer (3) by binding at N7 and O6.



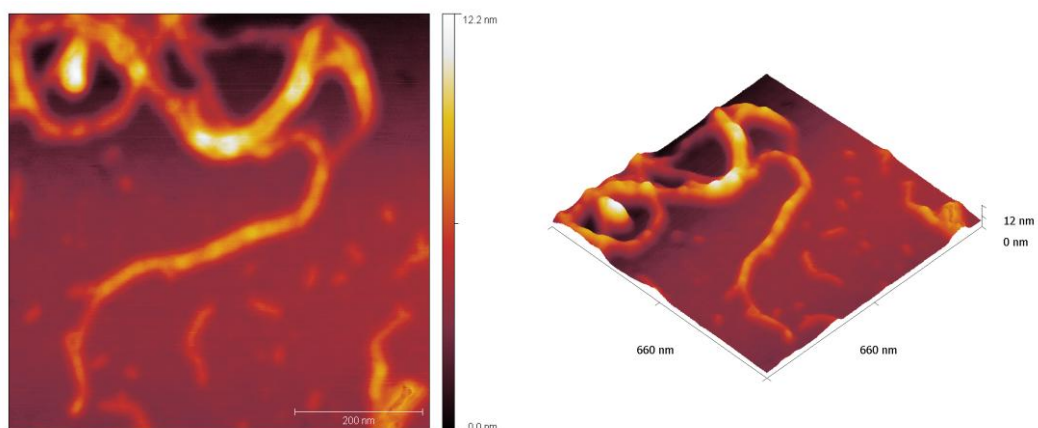
**Scheme 2** Molecular structures for the cationic dyes, methylene blue (4) or Hoechst-33258 (5).



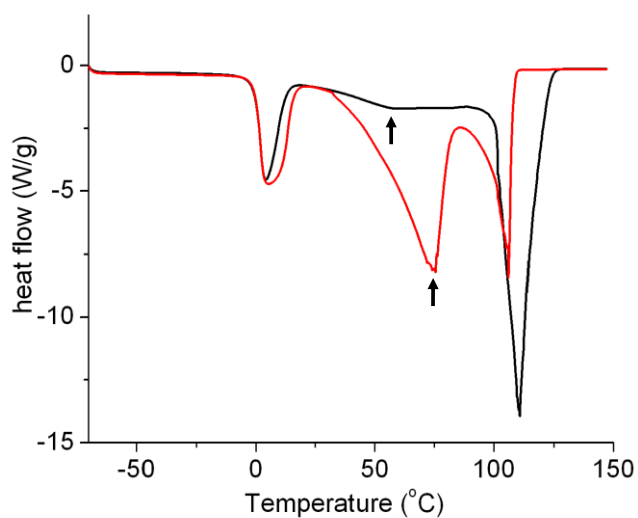
**Figure S1** (b) Oscillation frequency sweep at a fixed stress 100 Pa for 1:1 ( $G'$  ■,  $G''$  ●) and 1:1.25 ( $G'$  ■,  $G''$  ●) hydrogels



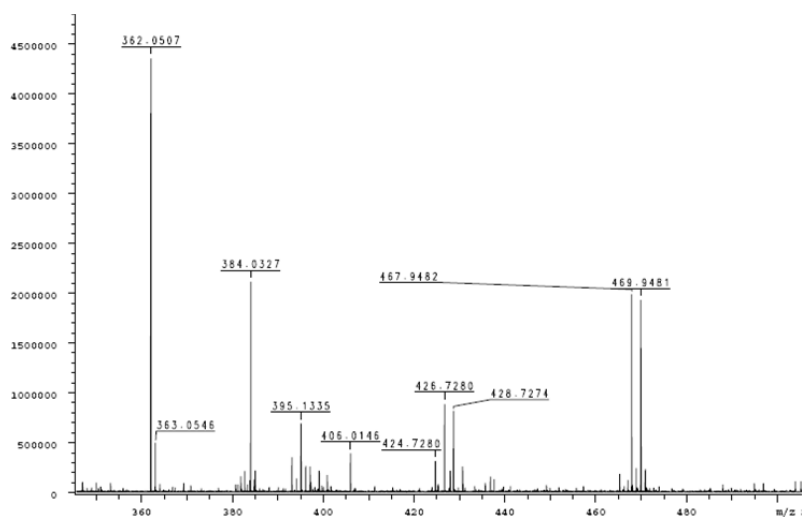
**Figure S2** (a,b) Histogram of nanofilaments widths for Ag-GMP hydrogels prepared at GMP : Ag molar ratios of (a) 1:1 and (b) 1:2. (c) Particle size distribution of Ag nanoparticles produced in association with Ag-GMP nanofilaments. (d) UV-Vis spectra of Ag-GMP wet (1:1 red, 1:2 green) and lyophilized (1:1 black, 1:2 blue) hydrogels after photoreduction showing surface plasmon resonance band at 438 nm.



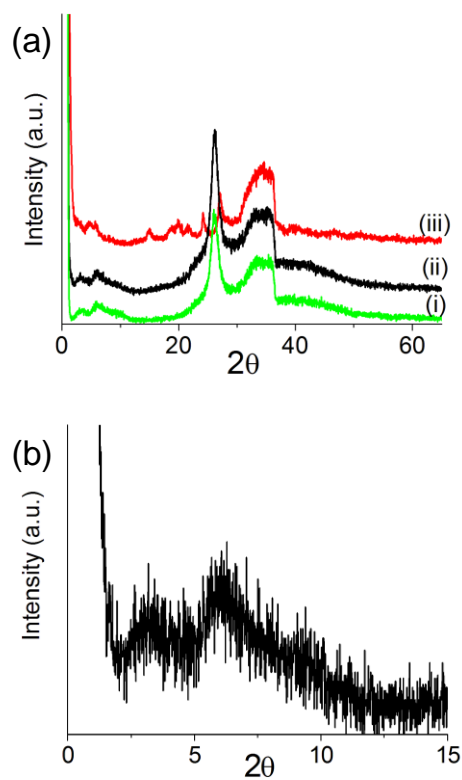
**Figure S3** AFM tapping mode images of supramolecular 1:2 hydrogel nanofilaments dried onto a mica substrate



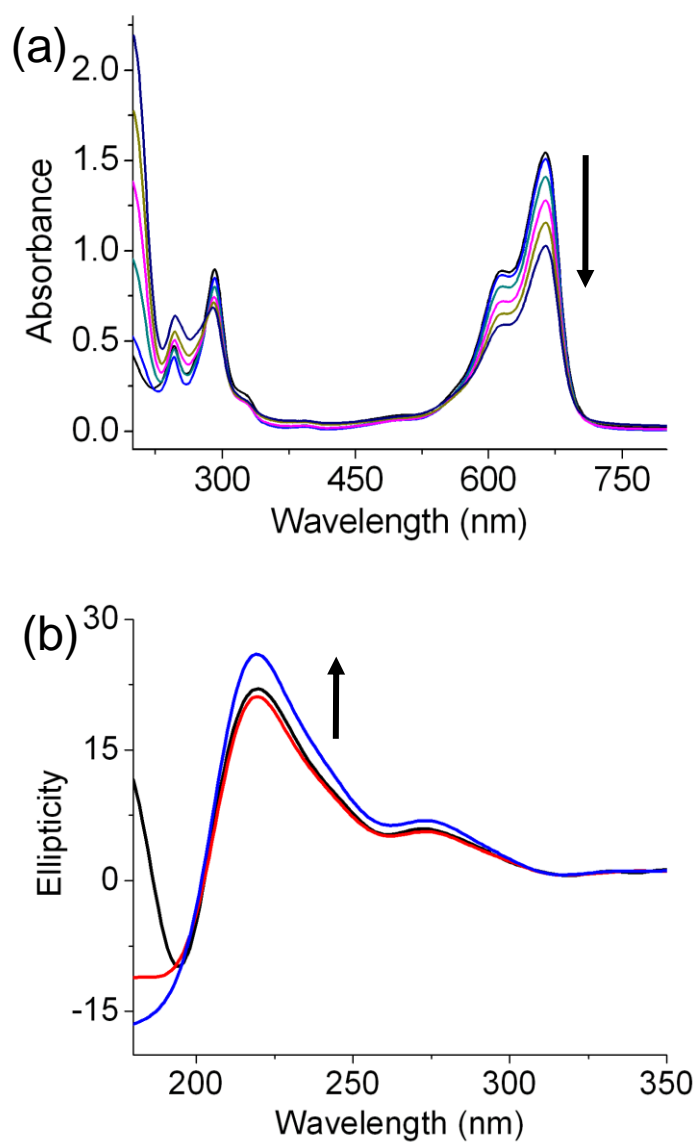
**Figure S4.** DSC curves for 1:1 (black) and 1:2 (red) Ag-GMP hydrogels showing broad gel-sol transitions at 52 or 75 °C, respectively (arrows). Additional endothermic peaks at ~ 5°C and 105/110°C correspond to the melting and boiling of water strongly associated with the Ag-GMP nanofilaments.



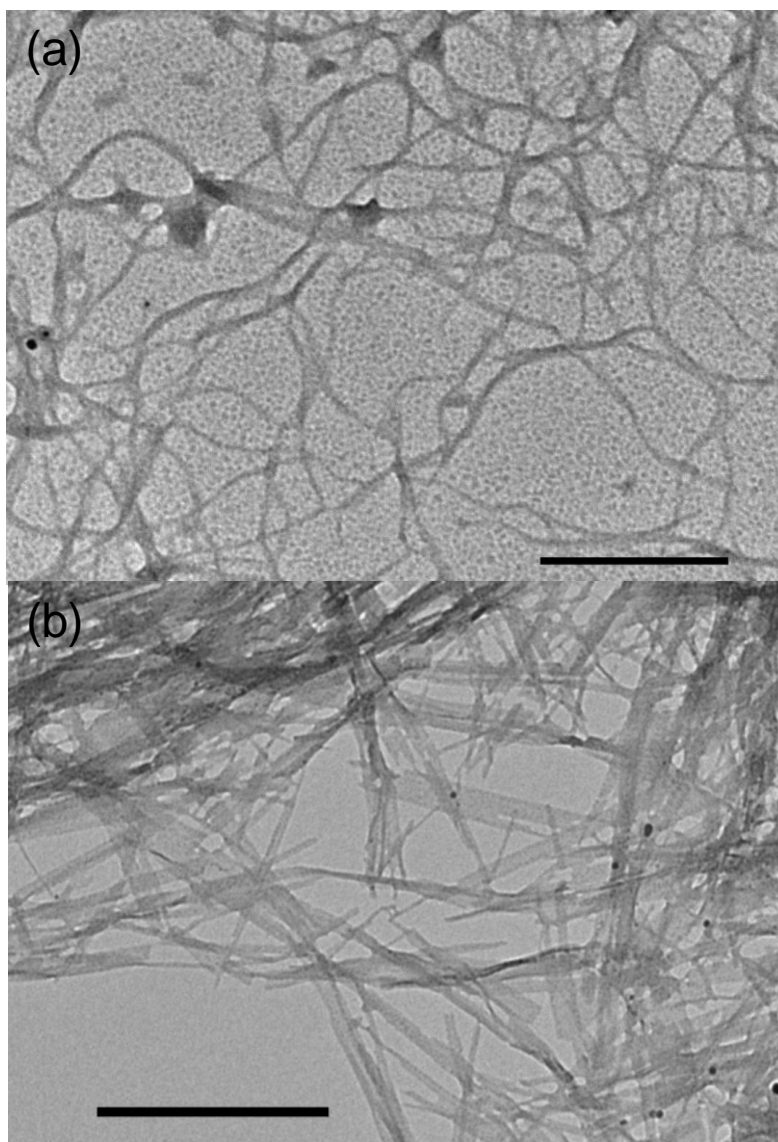
**Figure S5** Electrospray mass spectrum of Ag-GMP hydrogel,



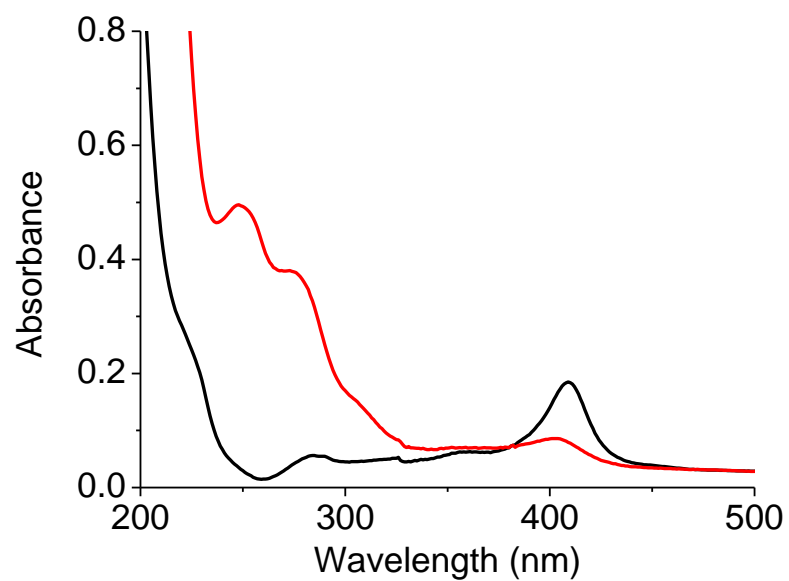
**Figure S6** (a) PXR D patterns of wet hydrogels prepared at (i) 1:1 or (ii) 1:2, or (iii) lyophilized 1:2 gel powder showing strong 0.34 nm reflection at  $2\theta = 26^\circ$ . The broad band at  $2\theta = 34^\circ$  possibly corresponds to reflections originating from  $\text{Na}_2\text{GMP}$  as reflections at  $2\theta = 33^\circ$  and  $34.7^\circ$  were observed in the control samples. (b) SAXS profile of lyophilized 1:2 hydrogel showing reflections at 2.9 and 1.45 nm.



**Figure S7** (a) UV-visible and (b) CD spectra for the titration of a 1:1 Ag-GMP hydrogel dispersion into aqueous methylene blue. Arrows indicate direction of change in peak intensities/ellipticity associated with increasing hydrogel concentration.



**Figure S8** TEM images of supramolecular Ag-GMP filaments produced in the presence of (a) methylene blue and (b) Hoechst-33258. Scale bars = 200 nm and 500 nm respectively.



**Figure S9** UV-Vis spectrum of Ag-GMP/cyt *c* hydrogel (red profile) showing nucleotide bands at 252 and 276 nm, and blue-shifted Soret peak at 402 nm. Black trace shows corresponding spectrum for native cyt *c* in aqueous solution.