Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information

Investigating the Adsorption of Anisotropic Diblock Copolymer Worms onto Planar Silica and Nanocellulose Surfaces using a Quartz Crystal Microbalance

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Electronic Supplementary Information (ESI) available: [details of any supplementary information available should be included here]. See DOI: 10.1039/x0xx00000x

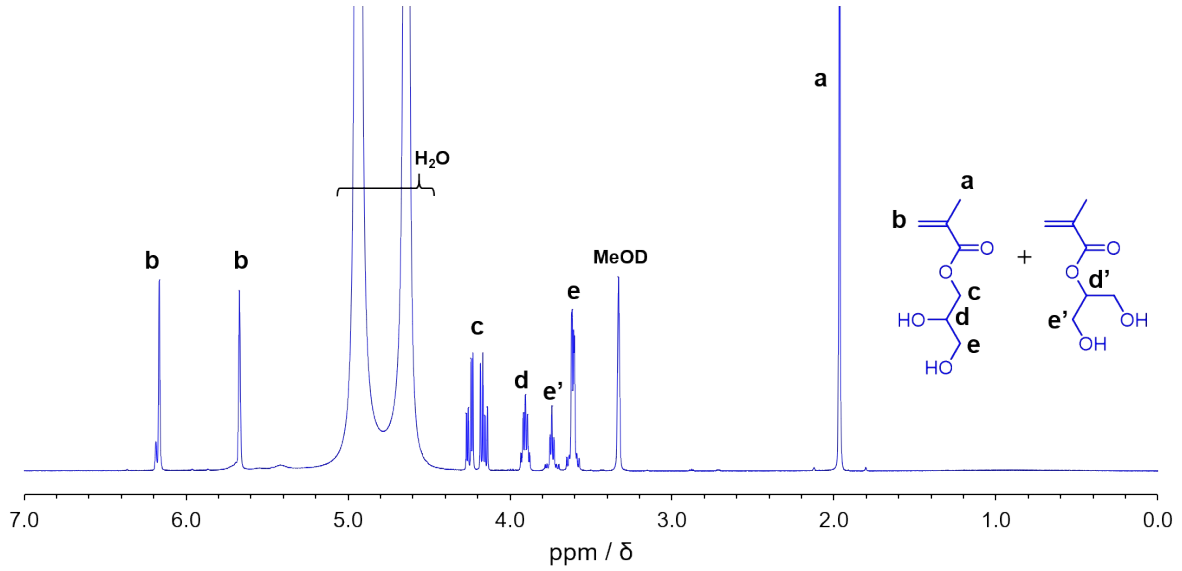

Figure S1. ^{1}H NMR (400 MHz, CD_3OD) spectrum obtained for glycerol monomethacrylate (GMA) prepared by hydrolysis of glycidyl methacrylate (GlyMA).

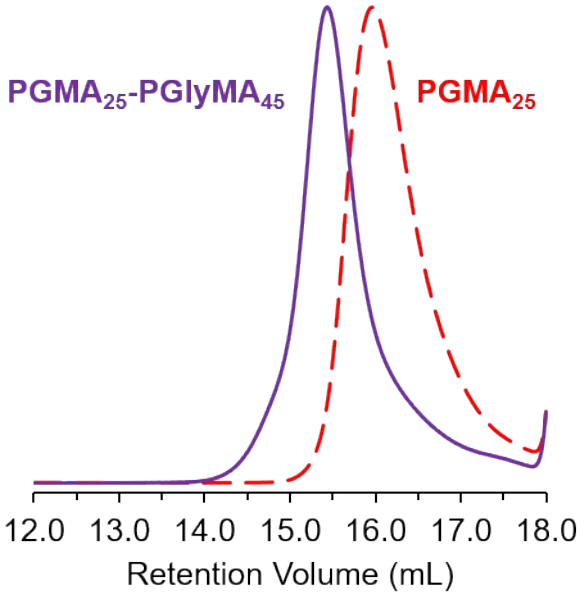

Figure S2. Overlaid DMF GPC chromatograms recorded for the $PGMA_{25}$ homopolymer precursor and the $PGMA_{45}$-$PGlyMA_{25}$ diblock copolymer prepared at 15% w/w solids by RAFT aqueous emulsion polymerization of GlyMA.

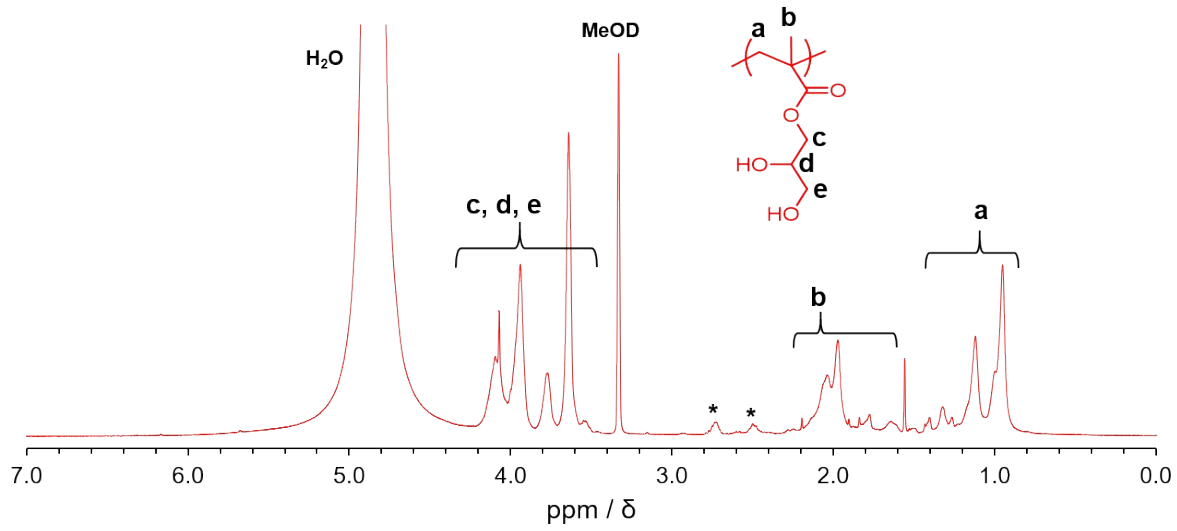

Figure S3. ^{1}H NMR (400 MHz, CD_3OD) spectrum recorded for the $PGMA_{25}$ precursor. The reaction mixture was sampled after the RAFT aqueous solution polymerization of GMA for 3 h and diluted with CD_3OD. Asterisks (*) indicate peaks arising from chain-ends originating from use of the CECPA RAFT agent; the signal at 2.73 ppm corresponds to two CH_2 protons (HOOC-C$\underline{H_2}$-CH_2-S-C(=S)-S-), while the signal at 2.50 ppm corresponds to four CH_2 protons (-C(CN)(CH_3)-C$\underline{H_2}$-C$\underline{H_2}$-COOH).

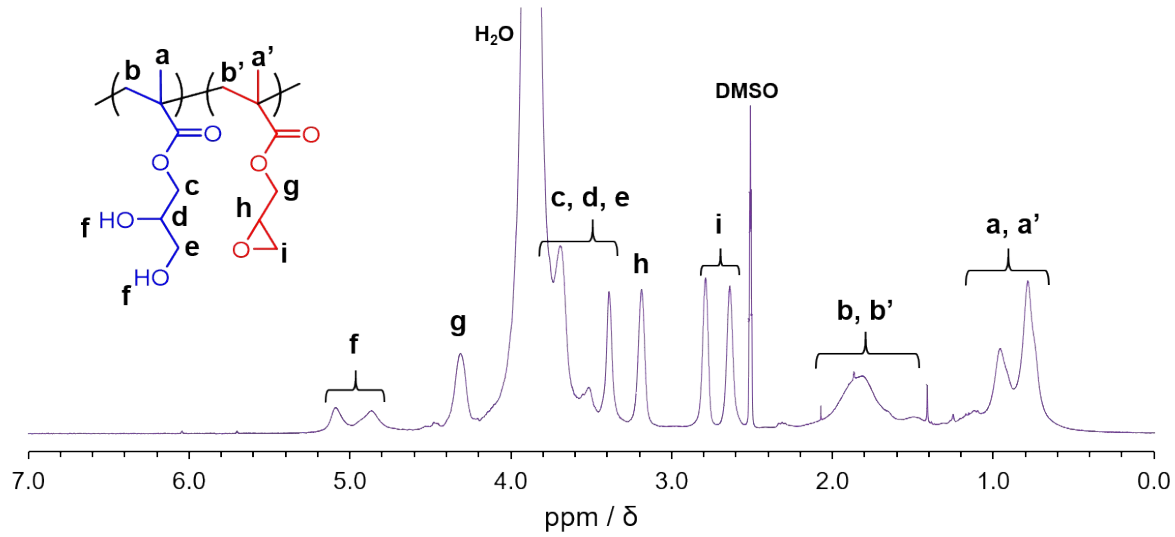

Figure S4. ^{1}H NMR (400 MHz, d_6-DMSO) spectrum recorded for the $PGMA_{25}$-$PGlyMA_{45}$ diblock copolymer prepared by RAFT aqueous emulsion polymerization of GlyMA. An aliquot from the final reaction mixture was diluted with d_6-DMSO.

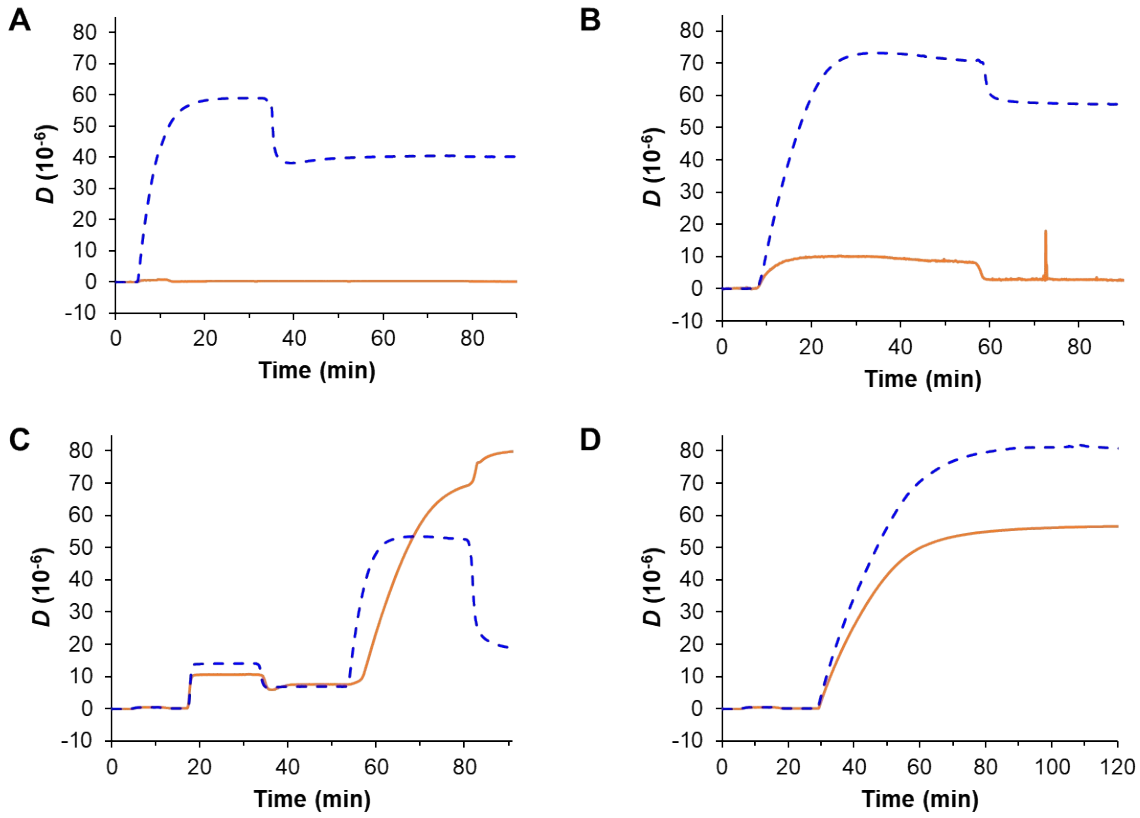

Figure S5. QCM-D dissipation (D) monitoring at a flow rate of 0.15 mL min^{-1} during adsorption of 0.1 g dm^{-3} aqueous dispersions of either anionic $PGMA_{25}$-$PGlyMA_{45}$ worms (orange solid lines) or cationic crosslinked $PGMA_{25}$-$P(GlyMA_{.}EDA)_{45}$ worms (blue dashed lines) on the following surfaces: (A) silica, (B) CNCs, (C) CNFs and (D) PEI-coated silica.

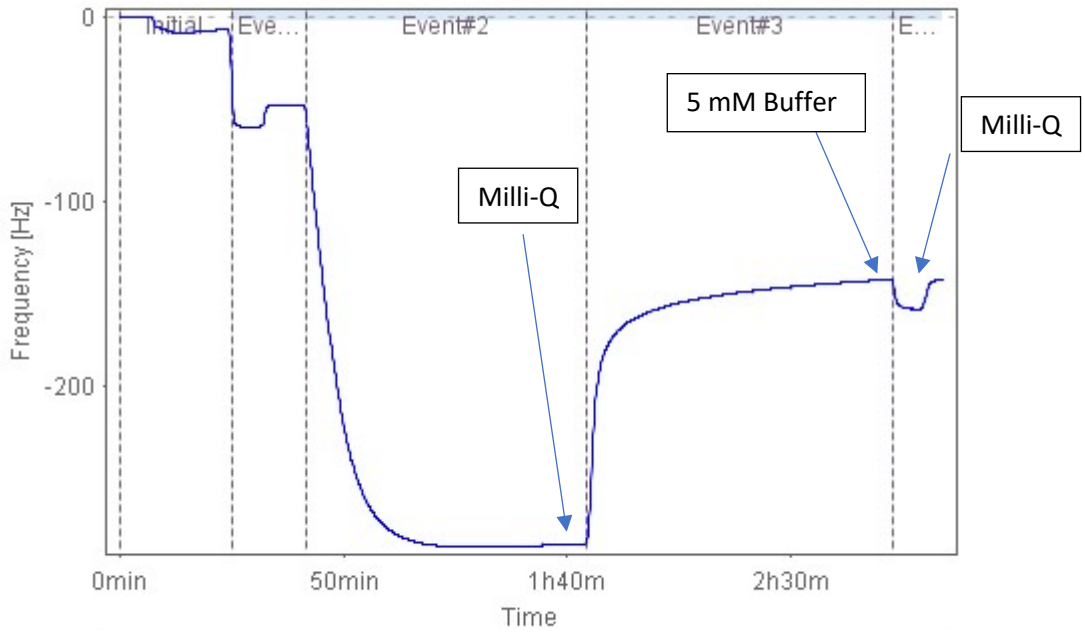

Figure S6. QCM-D analysis of the adsorption of cationic cross-linked $PGMA_{25}$-$P(Gly\text{-}EDA)_{45}$ worms onto an *in situ* generated CNF surface. The introduction of buffer, as marked after the rinsing step using Milli-Q water, is shown to indicate the effect of counter-ion exchange on the frequency shift (Δf = 18 Hz)

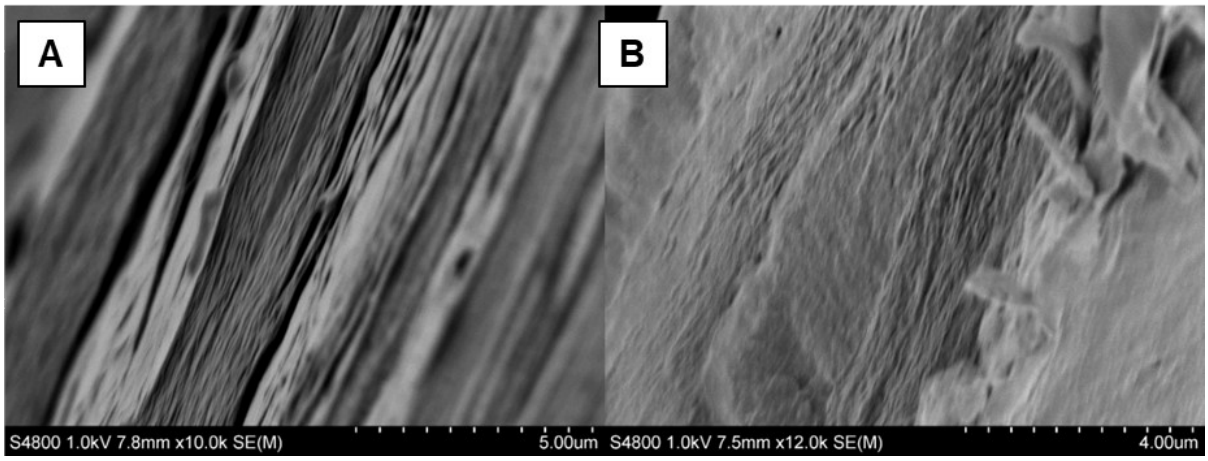

Figure S7. Field emission SEM images recorded for cross-sectioned worm/CNF nanocomposite films comprising 75% CNF by mass, with the remaining 25% mass being made up by either (A) anionic linear $PGMA_{25}$-$PGlyMA_{45}$ worms or (B) cationic cross-linked $PGMA_{25}$-$P(Gly\text{-}EDA)_{45}$ copolymer worms.

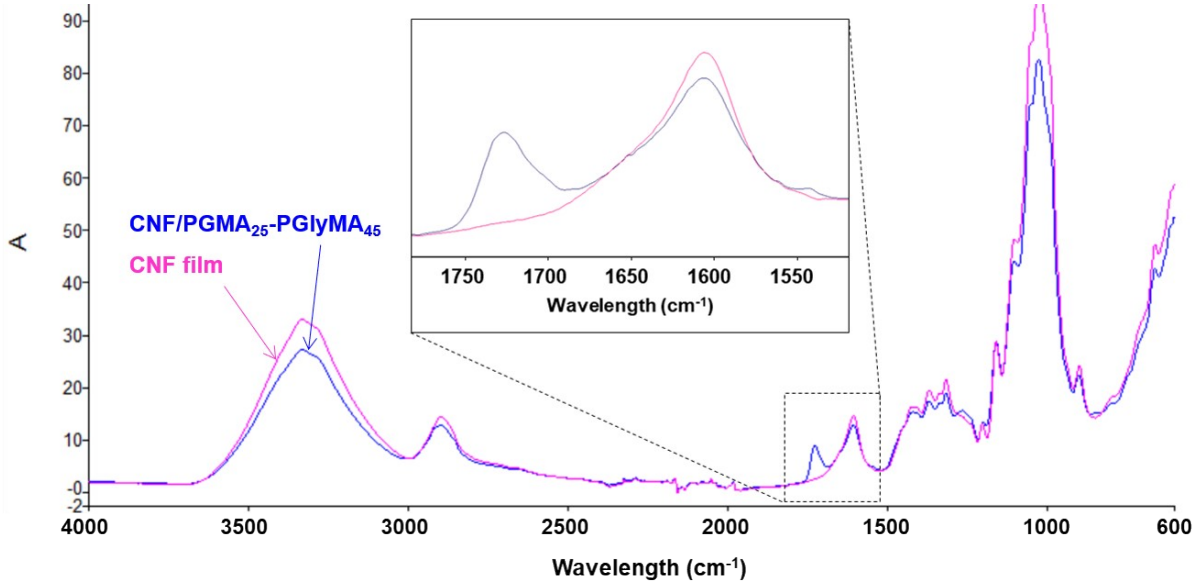

Figure S8. FTIR spectra for the CNF film (pink) and CNF/$PGMA_{25}$-$PGlyMA_{45}$ composite film (blue), comprising 25% w/w anionic $PGMA_{25}$-$PGlyMA_{45}$ copolymer worms and 75% w/w CNF. Inset shows the region 1500-1790 cm^{-1}.