Macromolecular Rapid Communications

Supporting Information

Histidine-Functionalized Diblock Copolymer Nanoparticles Exhibit Enhanced Adsorption onto Planar Stainless Steel

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Edwin C. Johnson[a], Derek H. H. Chan[a], Mark J. Smallridge[b] and Steven P. Armes[a,*]

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Summary of Schemes and Figures

Scheme S1. (a) Two-step synthesis of GEO5MA monomer.

Scheme S2. Synthesis of PGEO5MA$_{46}$ by RAFT solution polymerization in ethanol.

Figure S1. ^{1}H NMR spectrum recorded for PGEO5MA$_{46}$ homopolymer.

Figure S2. ^{1}H NMR spectrum recorded for PGEO5MA$_{46}$-PIPGMA$_{1000}$.

Figure S3. DMF GPC curves for a series of PGEO5MA$_{46}$-PIPGMA$_y$ nanoparticles (y = 500–2000).

Figure S4. Z-average diameter vs. PIPGMA DP determined by DLS studies of a series of PGEO5MA$_{46}$-PIPGMA$_y$ nanoparticles.

Figure S5. ^{1}H NMR spectra recorded for (a) PAGEO5MA$_{46}$-PIPGMA$_{500}$ and (b) PHisGEO5MA$_{46}$-PIPGMA$_{500}$.

Figure S6. TEM images recorded for (a) PAGEO5MA$_{46}$-PIPGMA$_{500}$, (b) PAGEO5MA$_{46}$-PIPGMA$_{1000}$, (c) PHisGEO5MA$_{46}$-PIPGMA$_{500}$ and (d) PHisGEO5MA$_{46}$-PIPGMA$_{1000}$ nanoparticles.

Figure S7. Digital image analysis of an SEM image of PHisGEO5MA$_{46}$-PIPGMA$_{1000}$ nanoparticles adsorbed onto stainless steel using ImageJ software suggests a fractional surface coverage, θ, of 0.23.
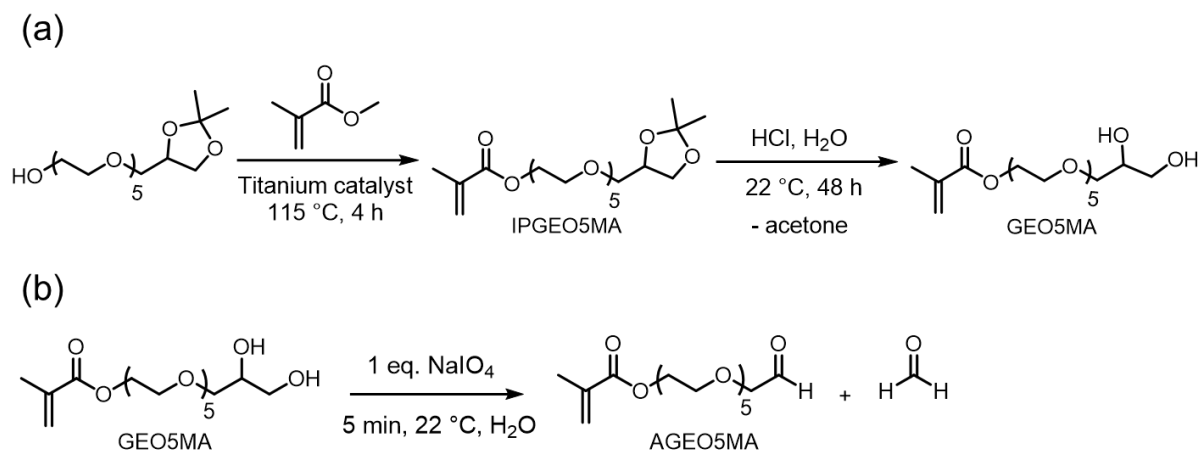
Scheme S1. (a) Two-step synthesis of GEO5MA monomer. The hydroxyl-capped oligo(ethylene glycol) isopropylidene glycerol precursor is transesterified with methyl methacrylate to produce IPGEO5MA, before removing the ketal protecting group with acid to afford GEO5MA monomer. (b) Selective oxidation of GEO5MA in aqueous solution using sodium periodate at 22 °C affords AGEO5MA with formaldehyde as a by-product. The same selective oxidation can be used to convert PGEO5MA homopolymer into PAGEO5MA homopolymer using identical reaction conditions.
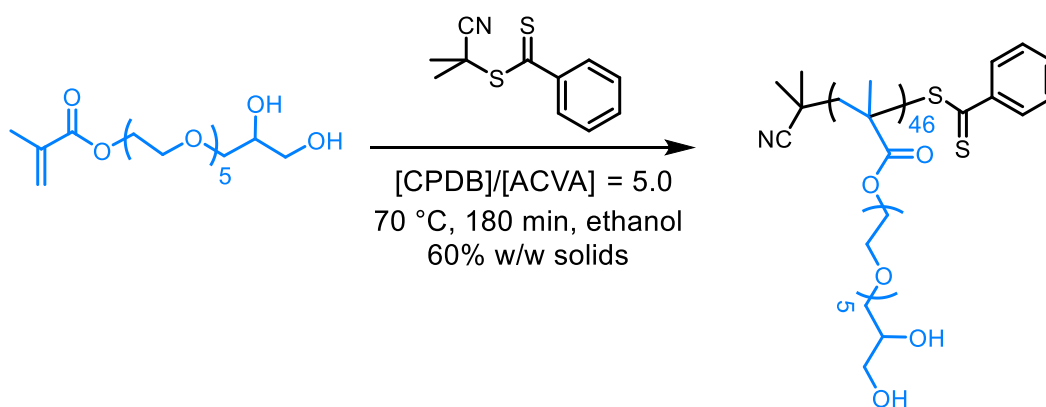
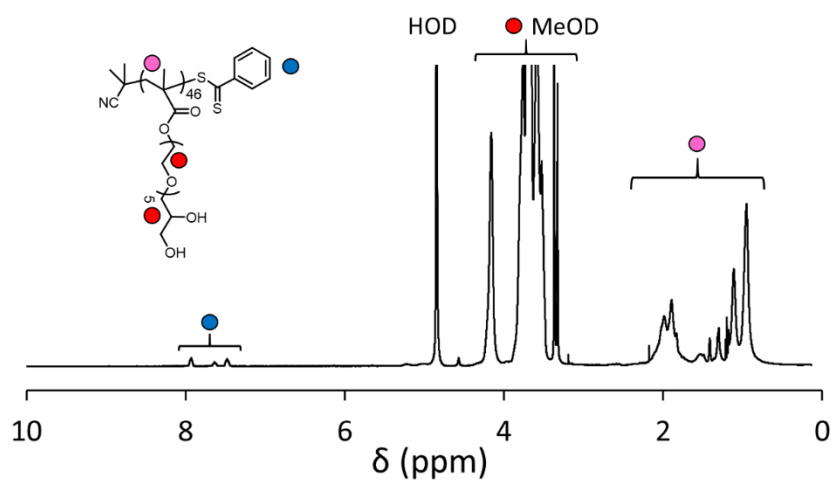**Scheme S2.** Synthesis of PGEO5MA$_{46}$ precursor by RAFT solution polymerization of GEO5MA in ethanol.

Figure S1. ^{1}H NMR (d_4-methanol) spectrum for PGEO5MA$_{46}$. Integration of the aromatic protons assigned to the end-group indicates a mean degree of polymerization of 46.
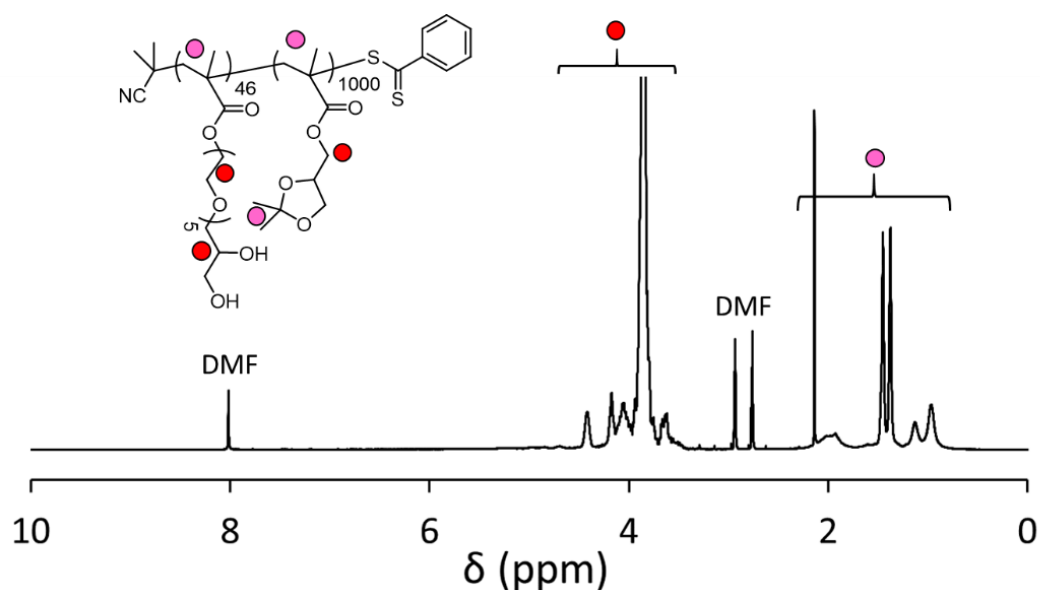
Figure S2. ^{1}H NMR (d_7-DMF) spectrum recorded for PGEO5MA$_{46}$-PIPGMA$_{1000}$. This spectrum was used to calculate the mean diblock copolymer composition.
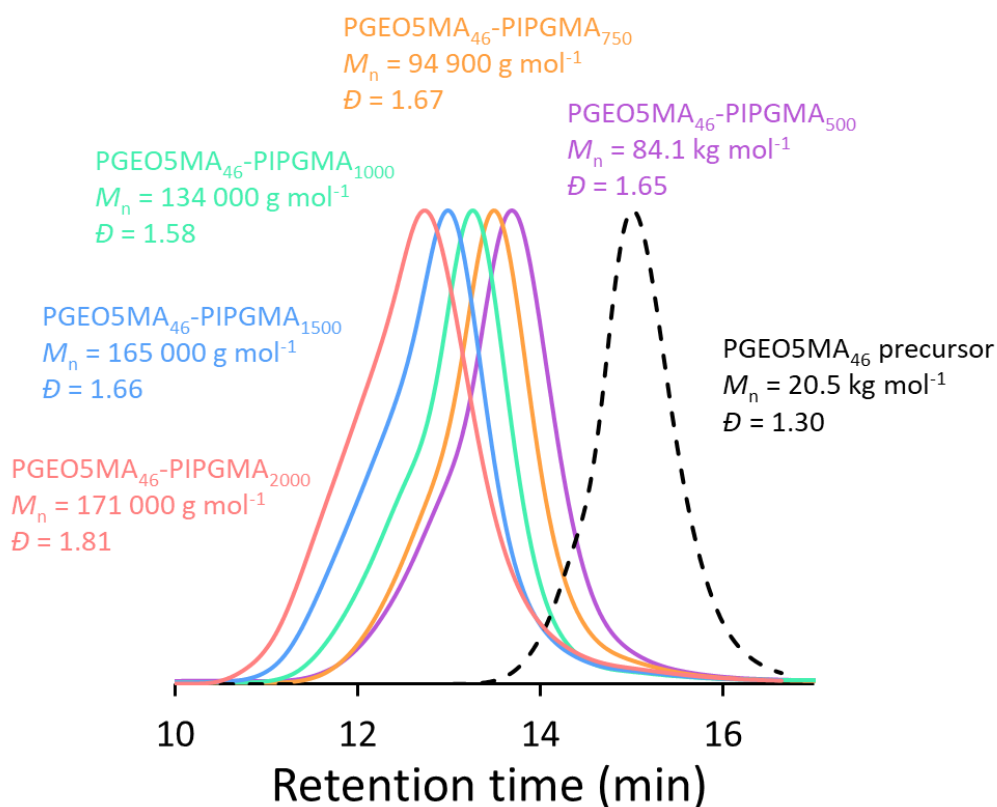

Figure S3. DMF GPC curves for a series of PGEO5MA$_{46}$-PIPGMA$_y$ nanoparticles (y = 500–2000). M_n values are expressed relative to a series of near-monodisperse poly(methyl methacrylate) standards.

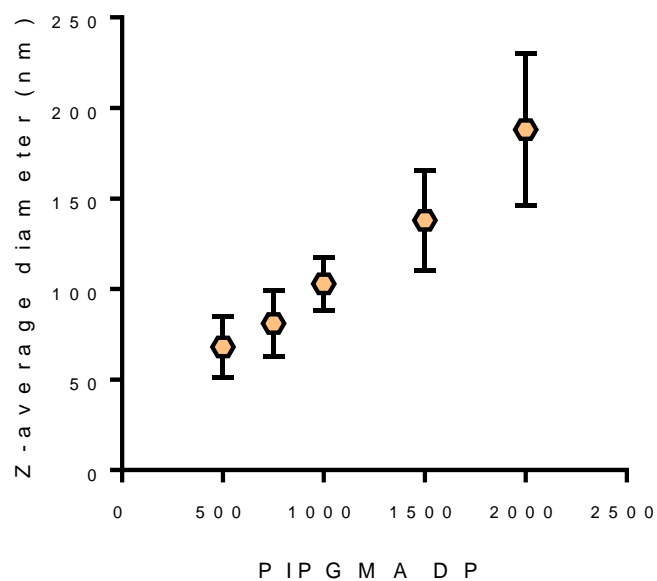**Figure S4.** Z-average diameter vs. PIPGMA DP determined by DLS studies of a series of PGEO5MA$_{46}$-PIPGMA$_y$ nanoparticles. Each standard deviation indicates the DLS polydispersity rather than the experimental error.
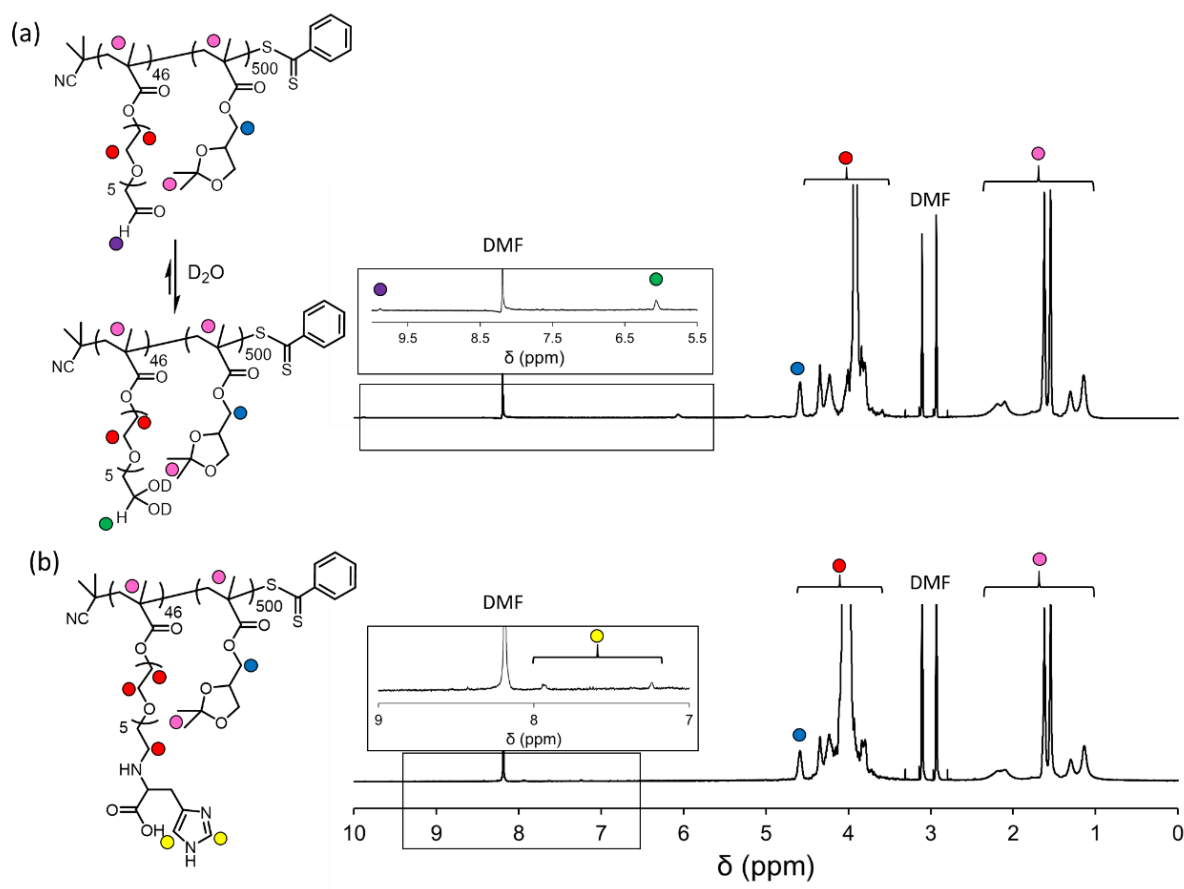
Figure S5. ^{1}H NMR (d_7-DMF) spectra recorded for (a) PAGEO5MA$_{46}$-PIPGMA$_{500}$ and (b) PHisGEO5MA$_{46}$-PIPGMA$_{500}$.

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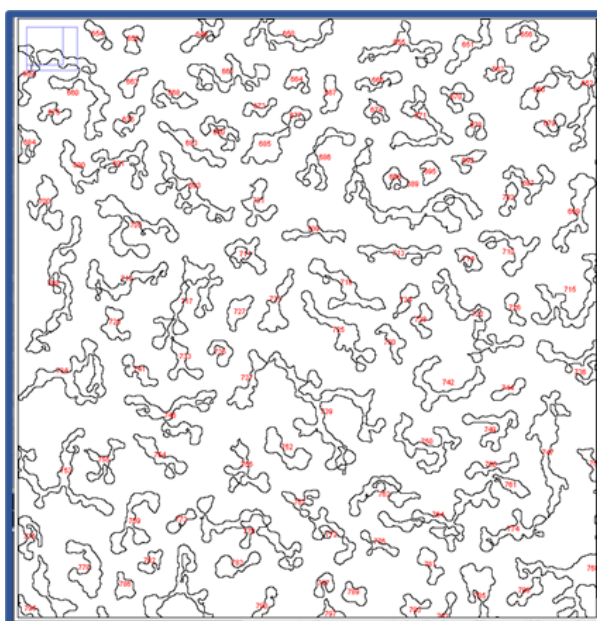

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