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**Diblock copolymers containing compositionally-uniform poly(HEMA-co-DMAEMA)** KYLE GUICE, RAYMOND TEOH, YUEH-LIN LOO, University of Texas — Hydroxyethyl methacrylate (HEMA) and dimethylaminoethyl methacrylate (DMAEMA) have been investigated as precursors for pH-responsive hydrogels. DMAEMA contains tertiary amine functionality that is reversibly protonated below its pKa. The swelling characteristics of poly(HEMA-co-DMAEMA) hydrogels are dependent on the distribution of DMAEMA, which in turn depends on the monomer composition and the monomer reactivity ratios. We find that the reactivity ratios are highly solvent dependent. Gradient copolymers are favored in most solvents at all monomer compositions. In dimethylsulfoxide, however, the reactivity ratios are near unity; compositionally-uniform poly(HEMA-co-DMAEMA) copolymers can therefore be synthesized at any composition. We have synthesized diblock copolymers containing poly(HEMA-co-DMAEMA) by a combination of atom transfer radical polymerization and click chemistry. The resulting diblock copolymers have controlled molecular weights, molecular weight distributions, and comonomer distributions, and they form well-defined periodic nanoscale structures consistent with their molecular characteristics.

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