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Synthesis and Characterization of Poly(hydroxyethyl methacrylate) Hydrogels Bearing Reversibly Associating Side Groups¹ CHRISTOPHER LEWIS, JIAHUI LI, MITCHELL ANTHAMATTEN, University of Rochester — Poly(hydroxyethyl methacrylate) (poly(HEMA)) is a technologically important hydrogel that can be processed into different shapes and is best known for its role in contact lenses. However, applications of water swollen poly-HEMA are limited by its poor mechanical properties. We are studying the influence of reversibly associating side groups on the behavior of poly(HEMA) hydrogels. In non-polar media, it is well known that ureidopyrimidinone (UPy) groups self-associate to form hydrogen bonded dimers (DDAA); however their behavior in water-swollen hydrogels is unclear. A series of poly(HEMA) linear polymers of controlled molecular weight with varying UPy content have been prepared using a reversible addition-fragmentation chain transfer (RAFT) polymerization technique. UPy content significantly reduces water swelling and improves mechanical properties. The degree of hydrogen bonding within water swollen hydrogels is studied, and properties of functional hydrogel polymers and networks are compared to an unswollen hydrophobic analog.

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