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Efficient Synthesis of Poly(hydroxyethyl Methacrylate)-b-Poly(dimethylaminoethyl Methacrylate) Block Copolymer by Atom Transfer Radical Polymerization. WEI TANG, YUEH-LIN LOO, Engineering Quadrangle, Princeton University, Princeton, NJ 08544-5263 — Polymers containing hydroxyethyl methacrylate (HEMA) and dimethylaminoethyl methacrylate (DMAEMA) have found wide applications in areas such as bioseparation, tissue engineering and controlled drug delivery. The controlled synthesis of block copolymers of PDMAEMA-b-PHEMA from PDMAEMA macroinitiator by atom transfer radical polymerization (ATRP), however, has not been successful due to the loss of chain end functionality during polymerization. We report an ATRP system that affords efficient chain extension from PDMAEMA to HEMA using Cu(0)/1,1,4,7,10,10-hexamethyltriethylenetetramine as the catalyst, 2-chloropropionitrile as the initiator in methanol at room temperature. A clear peak shift in the gel permeation chromatography trace towards shorter elution times indicates chain growth on HEMA addition. The chain end functionalities of PDMAEMA are thus retained and can be used to efficiently initiate chain extension reaction of HEMA. This new synthetic route opens new possibilities for the synthesis of pH- and temperature-responsive systems containing DMAEMA.

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