

## Poly(methyl methacrylate)-polyurethane-poly(methyl methacrylate) tri-block copolymers through atom transfer radical polymerization

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Poly(methyl methacrylate)-polyurethane-poly(methyl methacrylate) tri-block copolymers have been synthesized successfully through atom transfer radical polymerization. To prepare these tri-block copolymers, first telechelic bromo-terminated polyurethane was prepared from telechelic isocyanate-terminated polyurethane and 2-bromoethanol. Atom transfer radical polymerization of methyl methacrylate using telechelic bromo-terminated polyurethane as an initiator, CuBr as a catalyst and N,N,N,N',N''-pentamethyl diethylenetriamine as a complexing agent yielded poly(methyl methacrylate)-polyurethane-poly(methyl methacrylate) tri-block copolymers. As the polymerization time increases, both conversion and molecular weight increased and the molecular weight increases linearly with increasing conversion. These results indicate that the formation of the tri-block copolymers was through atom transfer radical polymerization mechanism. Proton nuclear magnetic resonance spectrum of the block copolymer shows that the protons present in both polyurethane and poly(methyl methacrylate) are intact which confirm the formation of the tri-block copolymers.