Preparation of Block Copolymer of Methyl Methacrylate and Vinyl Acetate by Atom Transfer Radical Polymerization in Supercritical Carbon Dioxide

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Abstract: A block copolymer (PMMA-b-PVAc) of methacrylate (MMA) and vinyl acetate (VAc) was synthesized by successive atom transfer radical polymerization (ATRP) in supercritical carbon dioxide ($scCO_2$). Vinyl acetate was polymerized in the presence of the PMMA precursor as macroinitiator, using metal halide/PMDETA complex system in supercritical carbon dioxide($scCO_2$). The effects of the time, pressure ratio between monomer (VAc) and macroinitiator (PMMA) were examined systematically to obtain an acceptable rate of polymerization and control over the polydispersity index (PDI) and number-average molecular weight(Mn).

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