Synthesis and characterization of MPEG-b-PDPA amphiphilic block copolymer via atom transfer radical polymerization

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Block copolymer micelles are generally formed by the self-assembly of amphiphilic block copolymers in an aqueous medium. The hydrophilic and hydrophobic blocks form shell and core micelles, respectively. The block copolymers of methoxy poly (ethylene glycol (MPEG) - b - poly (2-diisopropylamino) ethyl methacrylate(PDPA) were synthesized via atom transfer radical polymerization. The macroinitiator was synthesized by the coupling of 2-bromoisobutyryl bromide with MPEG in the presence of triethyl amine base catalyst. The atom transfer radical polymerization of PDPA was performed in conjunction with an N,N,N',N'',N'''-pentamethyldiethylene triamine / copper bromide catalyst system in DMF as the solvent at 70°C. The pH induced micellization / demicellization was studied by fluorescence using pyrene as a probe.