Automated Parallel Synthesis and Screening of a DMAEEMA and PEGMA Copolymer Library with LCST Behavior
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Stimuli-responsive polymers, also called “smart polymers”, that undergo phase transitions in response to external stimulus, have been widely investigated in various fields. Lower Critical Solution Temperature (LCST) provides many stimuli behaviors such as, temperature, pH, ionic strength, light or photochemical processes. To provide such materials, acrylamides and certain methacrylates have been widely studied because of their LCST behavior in water solution. Indeed, below this LCST, the polymer chains are soluble in water solution and exist in random coil conformation because of the existing hydrogen bonding interactions between the polymer and water molecules. However, when the temperature exceeds the LCST, these interactions are broken and the polymer chains collapse and then precipitate in the media. In this study, the effect of different ratios of N,N-(dimethylamino)ethyl methacrylate and poly(ethylene glycol) methacrylate random copolymers on the LCST behavior was investigated.

CONCLUSIONS

Table 1. Results of the random copolymerization of DMAEEMA and PEGMA. ([Monomers]/[CBDB]/[AIBN] = 100/1/0.25, T = 70 °C, solvent: toluene, time = 10 h. a) calculated by GPC; b) determined by GPC calibrated with PMMA standards. Solvent: CDCl3/N-isopropylacetamide (94/4/2), c) determined by 1H NMR, Solvent: CDCl3.

LCST (°C)

References:

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