Synthesis of PS microspheres using novel cross-type vinyl urethane macromonomer (C-VUM) as a reactive stabilizer

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Bifunctional cross-type vinyl urethane macromonomer(C-VUM) was synthesized and applied to the dispersion polymerization of styrene in ethanol. The structure of C-VUM macromonomer was confirmed using ^{1}H NMR and FT-IR. The tail of C-VUM macromonomer constitutes polyethylene glycol(PEG), the molecular weight were 400, 2000, 4000, and 8000 g/mol. The grafted polystyrene microspheres having the size (Dw) of 2.98 *um* and good uniformity of 1.005 were obtained with 10 wt% C-VUM-2000 macromonomer. The average size of the PS microspheres decreased and molecular weight of C-VUM-PS increased with PEG molecular weight. The higher molecular weights and much enhanced thermal stability of the PS particles were obtained compared to the one prepared using the conventional stabilizer, PVP. The C-VUM macromonomer acts not only as reactive stabilizers, but also as grafting agents in the dispersion polymerization.