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CONTROL OF FUNCTIONAL SITE LOCATION FOR THERMOSETTING LATEXES: THE EFFECT OF BIMODAL PARTICLE DISTRIBUTION

M. Soucek, E. Pedraza

Department of Polymer Engineering, University of Akron, 250 S. Forge St., Akron, OH 44325-0301 USA (msoucek@uakron.edu, http://www.poly-eng.uakron.edu/soucek.php)

Functionalized core-shell latexes were prepared by copolymerization of butyl acrylate and methyl methacrylate with 2-hydroxyethyl methacrylate (HEMA). Colloidal stability, particle size, particle size distribution, film properties and morphology were studied as functions of functional monomer content. The upper limit functionality content was limited by the stability of the system during synthesis. A bimodal particle size distribution was observed for high concentrations of functional monomers. The location of hydroxyl functionality was further investigated by preparing large and small latex particles with and without hydroxyl functionality. Large and small latex particles with and without hydroxyl functionality were blended together and crosslinked with melamine-formaldehyde (M-F) resin. The mechanical and thermo-mechanical properties were evaluated as function of blend ratio and functionality location. It was shown that the mechanical properties were dependent on the location of the functionality. The higher concentration of hydroxyl groups in the small latex particles contributed more to the tensile properties of the latexes than the functionality of the large particles. The location of the M-F resin in the small latex particles resulted in a lowering of the volume fraction needed for a continuous network.