Preparation of Carboxylated Polystyrene Nanoparticles and Investigation on Their Size and Surface Roughness

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Size-controlled carboxylated polystyrene nanoparticles were prepared by emulsifier-free emulsion polymerization process with comonomer. To control the size and shape of nanoparticles, concentration of the ammonium hydroxide was varied. Through the control of pH monodisperse polystyrene latex particles in the size range from 100 to 400nm were prepared. The particle size increased with higher concentration of ammonium hydroxide in the absence of comonomer. In addition, the surface morphology became rough with a rise of the acrylic acid contents and the reduction of ammonium hydroxide concentration. These size and morphology changes are thought to be influenced by the charge interaction between acrylic acid and ammonium anion, which changes stability during the polymerization.