

Preparation of Surfactant-Free Emulsions Stabilized by Alumina Particles via Pickering Emulsion Polymerization

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The preparation of waterborne emulsion requires surfactants, which remain on dried films and deteriorate mechanical properties and water resistance of the film. To overcome these disadvantages, Pickering emulsion (PE) polymerization, which contains solid particles as a stabilizer, has been carried out. In this study, nano-sized gamma-alumina particles were used. Alumina is often added to polymer compounds as a reinforcing agent. Nevertheless, researches on PE stabilized by alumina have not been conducted elsewhere yet.

Butyl acrylate and methyl methacrylate were used as monomers and glycidyl methacrylate was used as a comonomer. KPS, AIBA, VA-086, and AIBN were used as an anionic, cationic, nonionic, and oil soluble initiator, respectively. Only with KPS a stable emulsion was prepared by using alumina. The prepared emulsions were characterized by TGA and TEM, and the results showed that the alumina was located around the polymer particles, stabilizing them. Finally, it was confirmed that the film prepared by the PEs showed higher water resistance and tensile strength than those prepared by the conventional methods.