

Dispersion stability of waterborne polyurethane dispersion effect of isocyanate type and internal emulsifier content

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For industrial applications, long-term dispersion stability is one of the important characteristic of waterborne polyurethane dispersion. We determined the effect of isocyanate type and internal emulsifier content on the dispersion stability of the waterborne polyurethane dispersions that were synthesized with polycarbonate-diols and various isocyanates. The variation of the viscosity and particle size of the waterborne polyurethane dispersions, which are influenced by the hard-segment content, the molecular weight, and solid content of the waterborne polyurethane dispersions, was measured with time at different temperatures. Conventional acetone process was applied to synthesize WPUD samples with polycarbonate-diols, dimethylol propionic acid, dibutyltin dilaurate catalyst, and three different diisocyanate: isophorone diisocyanate, 4,4'-methylenebis(cyclohexyl isocyanate) and hexamethylene diisocyanate. Two types of chain extender, ethylene diamine and 1,4-butandiol, were used. The molecular weight and hard-segment content of the WPUD were controlled by varying NCO index(=[NCO]/[OH] ratio) and the content of dimethylol propionic acid.