

Influence of pH and Acrylic Acid on the Drying and “Water Whitening” Resistance of Waterborne Adhesive Films

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Abstract

During processing, conventional solvent-borne adhesives and coatings discharge volatile organic components (VOCs) into the atmosphere. Due to increasing public awareness and tighter environmental legislation in recent times, the importance of waterborne polymer colloids for these applications has never been so high, as they discharge minimal amounts of VOCs. In this study, we have investigated the effects of acrylic acid (AA) copolymerized in latex particle shells and pH on the rate of water loss and the extent of water entrapment in drying films. We used magnetic resonance profiling to obtain information about the distribution of water within a drying film and the rate of water loss. Our experiments have provided evidence that when there is AA copolymerized in the particle shells, the rate of water loss is faster and water entrapment is lower at a lower pH value. Fortuitously, these same films have lower “water whitening” caused by water uptake in comparison to films cast at higher pH or without the presence of AA in the shell. The materials system is therefore promising for transparent adhesive applications.