

Drying influence on film forming water borne dispersions for adhesive applications

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Water-based film forming polymer dispersions are often used as environmentally friendly, solvent free adhesive systems. These dispersions usually consist of polymer particles, water and surfactants. In the first drying regime the solvent evaporates and particle compaction occurs. When the particles are sufficiently concentrated, they start to coalesce and film formation takes place. The properties of the film are influenced by the drying process. The underlying mechanisms are complex and subject to ongoing scientific investigation. Despite intense research they are not yet fully understood.

In this work the influence of drying conditions on the surfactant distribution and film properties, such as adhesive force, were under investigation. Both drying temperature and heat and mass transfer coefficients in the gas phase were controlled and varied in the experiments. Subsequently the component distribution in the dried film was obtained by 3D Micro Raman spectroscopy. This measurement technique enables local measurement of component concentrations with a spatial resolution of about 2-3 μm . The influence of the component distribution on the adhesion properties has been evaluated. Results at different drying conditions are presented.