

# Skin Formation during the Film Formation of Waterborne Acrylic Pressure-Sensitive Adhesives containing Tackifying Resin

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## Abstract

Tackifying resins (TR) are often used to improve the adhesive properties of waterborne pressure-sensitive adhesives (PSAs) derived from latex dispersions. There is a large gap in the understanding of how and to what extent the film formation mechanisms of PSAs are altered by the addition of TR. Our magnetic resonance profiling experiments have found that the drying time of a waterborne, acrylic PSA is increased by the addition of TR, because it creates a coalesced surface layer or “skin” that traps water beneath it. Atomic force microscopy of the PSA surfaces supports this finding. In the absence of the TR, particles at the surface do not coalesce but are separated by a second phase composed of surfactant and other species with low molecular weight. The function of the TR is somewhat paradoxical. It increases the glass transition temperature of the polymer, decreases its mobility, but it also promotes the coalescence of latex particles, which, in turn, prevents the exudation of surfactant. The TR probably enhances the coalescence of the latex particles by being miscible both with the latex serum phase and with the acrylic polymer.

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