

## What is at the surface? Paint adhesion to polyolefins

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Polyolefins have low free surface energy that prevents good wettability of adhesives or paint emulsions to their surface. In the present work we show that adhesion of olefin block copolymer (OBC) to a polyurethane based paint can be significantly improved by blending thermoplastic polyurethane (TPU) into OBC. Further, in order to explore the underlying mechanism of paint adhesion to TPU/OBC blends, blend morphologies near the paint/polymer interface and surface compositions of injection molded plaques, were investigated by secondary electron microscopy (SEM) and x-ray photoelectron spectroscopy

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(XPS). It was found that for 35 wt% and 25 wt% TPU loading, TPU from the blends are attached with the top paint layer at interface, whereas for 15 wt% loading this attachment could be barely observed. XPS and SEM gave consistent results demonstrating that surface composition of these blends is higher than the percentage of incorporated TPU. This is explicable given the viscosity match between TPU and OBC during injection molding. We speculate that during painting and the subsequent drying step, polyurethanes from the paint diffuse into blend substrate and entangle with TPU in the blend. The entanglement between paint and substrate generates a physical link that provides adhesion.