Impact of x-Linkable Polymer Blends on Phase Morphology and Adhesion CHUN LIU, GRACE WAN, ELLEN KEENE, JOSEPH HARRIS, SIPEI ZHANG, STEPHANIE ANDERSON, COLIN LI PI SHAN, Dow Chemical Co — Adhesion to dissimilar substrate is highly important to multiple industrial applications such as automotive adhesives, food packaging, transportation etc. Adhesive design has to include components that are affinity to both substrates, e.g. high surface energy polar and low surface non-polar substrates. Typically, these adhesive components are thermodynamically incompatible with each other, leading to macrophase separation and thus adhesive failure. By using functional adhesive components plus some additives, the adhesive can be in-situ cross-linked to prevent the macrophase separation with controlled phase morphology. Herein, we present the study on a cross-linkable adhesive formulation consisting of acrylic emulsion and polyolefin aqueous dispersion with additives for enhancing cross-linking and controlled phase morphologies. Contact angle measurement and ATR-IR spectroscopy are used to characterize the properties of adhesive surface. DMA is used to study the mechanical property of adhesive before and after cross-linking. The detailed phase morphologies are revealed by AFM, SEM and TEM. The resulting adhesive morphologies are correlated with the adhesive performance to establish structure-property relationship.

Chun Liu
Dow Chemical Co