

## **463b Role of Amphiphilic Additives in Determining the Extent of Fragmentation in Water-Based Acrylic Pressure Sensitive Adhesive Films during Recycling Operations**

*Xing Geng, Steven J. Severtson, and Larry Gwin*

This presentation identifies properties and laminate component interactions that control the fragmentation behavior of PSA films during paper recycling. It was previously reported that environmentally benign thermoplastic or hot-melt formulations were developed by controlling the thermal location of phase transitions relative to temperatures used to process recovered paper. This is done to inhibit film fragmentation during repulping operations resulting in higher removal efficiencies via standard cleaning processes such as pressure screening. It was also reported that ply adhesion within the laminate in aqueous environments and the wet-strength of facestocks strongly influence removal efficiencies, indicating that PSA film configuration governs, to a large extent, fragmentation during repulping. Here, the applicability of these findings to the more complex water-based formulations is discussed. It will be shown that in addition to the mechanical properties of the base acrylic polymer and laminate facestocks, fragmentation of water-based systems are influenced by amphiphilic chemicals. Surfactants such as emulsifiers, wetting agents and defoamers are used in water-based formulations to aid in their processing and can be retained at significant levels in dried films. This is shown to change film surface energies influencing adhesion between pressure sensitive label components and measured removal efficiencies for the PSA. The results identify surfactant characteristics that minimize the environmental impact of water-based PSA laminates.