

## Monitoring the drying and curing of two component waterborne polyurethane coatings with Inverse-Micro-Raman-Spectroscopy

The drying and curing of thin polymer films like waterborne polyurethane protective coatings and varnishes is a very important step in manufacturing processes. Due to more and more stringent regulations concerning the amount of Volatile Organic Compounds (VOC) in coating formulations, paint manufacturers have to consider the formulation of their coatings. One option to meet new VOC requirements is to replace the organic solvent by water. The presence of water of course makes these coatings heterogeneous by nature and their final quality is greatly influenced by the way all components are mixed. Two component PU coatings particularly represent one of the most promising technologies for waterborne systems. Previous works have shown that Inverse-Micro-Raman-Spectroscopy (IMRS) is a powerful technique to investigate concentration profiles in transparent multi-component systems. With the non-invasive technique we can draw a 3-D map of the film without influencing the system. In this contribution, investigations of film drying and curing of two component waterborne polyurethane (PU) coatings are reported.

We monitor the degree of cross-linking and measure possible heterogeneities in the film. Exemplarily, you can see in fig. 1 the average content of cross-linking at different lateral positions of the film as function of the curing time.

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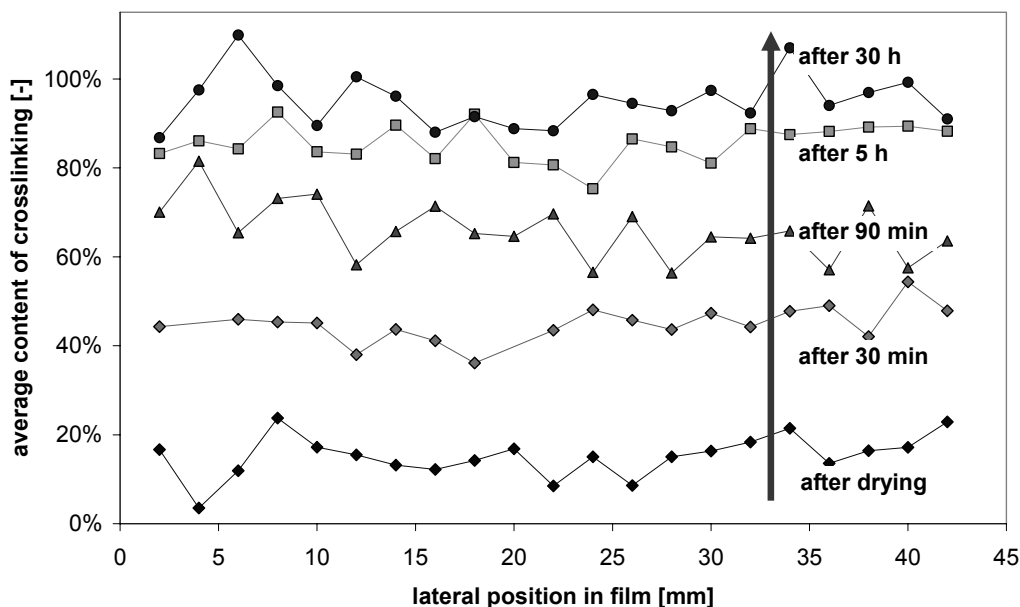


Figure 1: Degree of Cross-linking of a Water Borne 2K-PU Coating at different positions in the coating versus drying and curing time.