Molecular Heterogeneity Analysis of Carboxylic Acid Functionality in Waterborne Synthetic Polymers

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Waterborne polymers commonly use carboxylic acid functionality to achieve water dispersibility, but incorporation of this functionality has a huge impact on polymer processing, coating properties and, not unimportant, the final cost. The characterization of this functionality is still significantly lacking, as common liquid state separations such as Size Exclusion Chromatography and Reversed Phase Chromatography only describe a certain aspect of a polymer. As the total polymer architecture is immensely complex due to presence of a variety of distributions (molecular weight distribution, functional type distribution, end-group distribution) and the wide range of monomers used in commercial synthetic polymers, these methods of separation provide limited information on carboxylic acid incorporation.

In this presentation, we would like to share our research on the molecular heterogeneity analysis of incorporated carboxylic acid functionality;
- Identification and quantification of these incorporated carboxylic acid groups in polymers by TAG-Pyr-GC [1]
- Average concentration of these incorporated carboxylic groups over the molecular weight of these polymers by TAG-SEC
- Charge-based separations of these types of synthetic polymers using Non-Aqueous Capillary Electrophoresis (NACE) and Non-Aqueous Ion Exchange Chromatography (NAIEX), to gain insight in the incorporation of these carboxylic acids groups in the polymer chains.

References