# 2-DIMENSIONAL CHROMATOGRAPHIC SEPARATIONS OF BRANCHED POLYMERS

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Branching in polymers significantly influences material properties. Thus, proper characterization methods are required to prove the target structure and product quality. However, the characterization of branched molecules, especially the determination of the branching distribution, still is a challenge for polymer scientists. Spectroscopic methods like nuclear magnetic resonance (NMR) spectroscopy can be used to determine the average number of branches. By light scattering or viscometry measurements one relates the size of the macromolecules in solution to the branching structure, based on the well known paper of Zimm and Stockmayer published in 1949. These methods can be applied after a separation by size exclusion chromatography (SEC), reducing problems due to heterogeneity of real polymer systems. However, size exclusion chromatography (SEC) coupled with differential viscosity (DV) and/or light scattering (LS) detectors suffer by the coelution of polymers differing in their structure and molar mass.
The aim of the presented work therefore was developing new chromatographic methods to separate branched polymers with respect to molar mass and degree of branching. The presentation will discuss the elution behaviour of branched molecules having different degree of branching using gradient chromatography and chromatography at critical conditions of adsorption (LCCC). The combination of these chromatographic modes with SEC was used in a 2-dimensional approach. to separate blends of linear and branched polymers.