

The Challenges and Recent Advances in Polyolefins Comonomer Distribution Analysis.

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Over the last 30 years, several analytical techniques have been developed to analyze the comonomer distribution of polyolefins. The key techniques include temperature rising elution fractionation (TREF)¹, crystallization analysis fractionation (CRYSTAF)², and crystallization elution fractionation (CEF)³. All of these techniques are based on crystallinity, which primarily is a function of the comonomer composition and its distribution. Two key challenges for crystallization-based techniques are a narrow comonomer range (up to approximately 8 mol%) and co-crystallization. Co-crystallization can pose a challenge for complex multiple-component systems, even with increased analysis time to enhance resolution. Very recently, high temperature liquid chromatography of polyolefins (both at solvent gradient^{4,5} and thermal gradient^{6,7}) has been developed. These new techniques are able to separate a larger range of comonomer content and eliminate co-crystallization. This paper is focused on the recent advancements, understanding of the separation mechanism, and the application of various techniques to characterize complex polyolefin microstructures.

References:

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