

Studies on the application of filter-based IR detector for polyolefin characterization with HT-SEC.

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Even though polyolefins are simple polymers from chemical structure point of view, their full characterization in practice is still an intriguing task. Basic macromolecular characteristics of polyethylene or polypropylene like molar mass moments and their distributions (MMD) but also chain conformation and thus information on long-chain branching, can be addressed with high-temperature size-exclusion chromatography (HT-SEC). Hyphenation of infrared detection to size-exclusion chromatography expands possibilities of SEC even more and allows to reveal comonomer incorporation across molecular weight and thus generate a fingerprint of a given catalytic system used in polyolefin synthesis.

Multiband infrared detector gives an easy and fast access to so-called short-chain branches distribution (SCB) vs MMD by coupling to HT-SEC. In this work, we summarize recent findings on application of a filter-based detector (IR5-MCT) towards characterization of polyolefins synthesized with different catalytic systems and varying comonomer types. An influence of the comonomer type on IR5-MCT calibration line is elaborated. Finally statistical evaluation of different calibration lines is discussed in details. Based on this evaluation practical aspects of IR5-MCT calibration are mentioned.