

Characterization of Ethylene-Propylene Rubbers using DSC, CRYSTAF and HT-HPLC.

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Ethylene-Propylene rubbers (EPR) are mostly used as the toughening modifier for polypropylene, thus extending its usage in several practical applications like packaging, tubing, roof membranes¹. In this study, three commercial EPR samples with different ethylene contents were investigated. Preparative fractionations of these samples were carried out using temperature rising elution fractionation (TREF)^{2,3}. Detailed analyses of the separated fractions were conducted by crystallization-based and chromatographic techniques. The results of both differential scanning calorimetry (DSC) and crystallisation analysis fractionation (CRYSTAF) revealed that these TREF fractions contain components with different and large crystallizable sequences that have not been detected from the bulk samples analyses. A further more detailed chemical analysis using high temperature – high performance liquid chromatography (HT-HPLC)^{3,4} was done to comprehensively determine the chemical heterogeneity of these TREF fractions. Chromatographic separations showed the existence of long ethylene sequences in the EP chains and this behaviour was further confirmed by the FTIR analysis. In conclusion, the preparative TREF analysis together with a combination of various analytical methods proved to be useful tools in understanding chemical complexity of these rubber samples.

References:

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