

CHARACTERIZATION OF IMPACT POLYPROPYLENE AND ITS PREPARATIVE TREF FRACTIONS BY HIGH-RESOLUTION SOLID-STATE NMR

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ABSTRACT

Impact polypropylene copolymers are used in automotive and other applications since they combine low temperature impact resistance of heterophasic ethylene-propylene copolymers with the rigidity, thermal and chemical resistance of a polypropylene homopolymer. The development of highly sophisticated multidimensional analytical techniques is therefore required to fully understand the structure-property relationships of these interesting and complex materials. A number of simple and multidimensional off-line and on-line chromatographic as well as spectroscopic techniques have been developed to characterize impact polypropylene copolymers and their fractions obtained by using preparative temperature rising elution fractionation (TREF).

In the present study preparative TREF was used to fractionate impact polypropylene copolymers. These impact polypropylene copolymers and their fractions were characterized by high-resolution solid-state nuclear magnetic resonance spectroscopy (NMR). The results obtained with respect to the morphology, chain dynamics, miscibility, mobility and microphase structure by using a number of solid-state NMR techniques including two dimensional wideline separation (2D WISE), will be discussed.

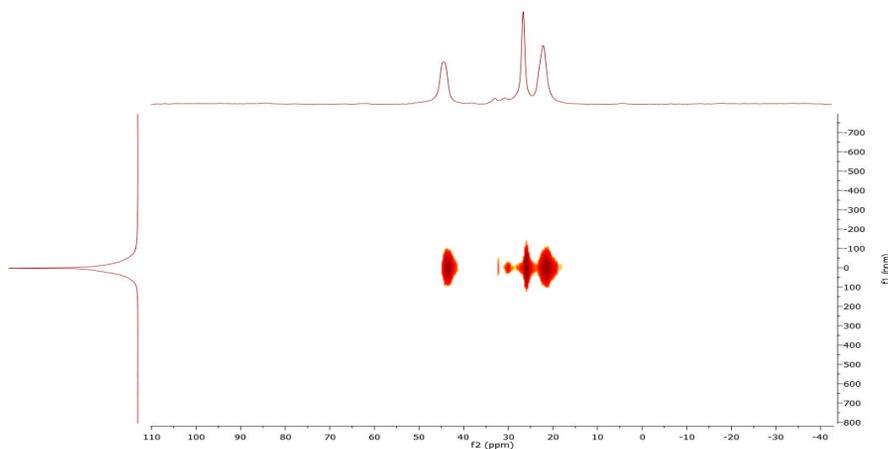


Fig. 1: 2D WISE experiment of bulk impact polypropylene copolymer