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Plastics — Polypropylene (PP) — Determination of isotactic index by low-resolution nuclear magnetic resonance spectrometry

Plastiques — Polypropylène (PP) — Détermination de l'indice isotactique par spectrométrie de résonance magnétique nucléaire à basse résolution

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Foreword

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This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The LR-NMR method in this document is a relative method established with ISO 9113 as the absolute method. The method and concept of isotactic index of polypropylene are specified in ISO 9113, that is, the polypropylene sample is separated into the extractable and the unextractable matter by n-heptane extraction, and the percentage of unextractable matter in the sample is calculated as isotactic index.

Isotactic index in ISO 9113 sounds similar to tacticity (isotacticity or stereotacticity) of polymer chain, but the concept and result are different. The result is related to but not equal to the tacticity (isotacticity or stereotacticity) of molecular chain, which can be determined by high resolution carbon-13 nuclear magnetic resonance and infrared method. The result of ISO 9113 is also related to crystallization, molecular weight, chain entanglement of the sample, solvent solubility and other effects.

For solid polymers, extraction always takes a long time for the diffusion of long molecular chain from polymer to solvent. To improve test efficiency, relative methods are developed. This document provides a relative non-destructive method for the determination of isotactic index by low-resolution nuclear magnetic resonance spectrometry through a calibration curve establishing with magnetic signal and isotactic index determined by ISO 9113. No solvent is used, and the determination efficiency is improved during samples measurement procedure except for the calibration part.