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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 40722.2-2021

Styrene-butadiene rubber(SBR) - Determination of the microstructure of solution-polymerized SBR - Part 2: FTIR with ATR method

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1.Structure and Drafting Rules of Standardization Documents"

Drafting.

This document is the second part of GB/T 40722 "Measurement of SBR Microstructure by Solution Polymerization of Styrene-Butadiene Rubber (SBR)".

GB/T 40722 has released the following parts.

---Part 2.Infrared spectroscopy ATR method.

The translation method used in this document is equivalent to the ISO 21561-2.2016 "SBR solution polymerization of styrene-butadiene rubber (SBR).

Determination of structure Part 2.Infrared spectroscopy ATR method.

A chapter "Terms and Definitions" has been added to this document.

The Chinese documents that have consistent correspondence with the normatively cited international documents in this document are as follows.

---GB/T 15340-2008 Natural and synthetic raw rubber sampling and sample preparation methods (ISO 1795.2000, IDT).

Introduction

The microstructure content directly affects the processing and application performance of solution polymerized styrene-butadiene rubber (S-SBR), which is important for guiding the new production of S-SBR.

Product development and product quality control are of great significance.

With the development of analytical detection technology, 1H-NMR method, infrared spectrum coating method, infrared spectrum ATR method and other detection methods are used for

Determination of polymer microstructure.

GB/T 40722 provides a technical basis for measuring the microstructure of solution polymerized styrene-butadiene rubber.

GB/T 40722 is intended to be composed of two parts.

---Part 1.1H-NMR method and infrared spectroscopy coating method. The purpose is to satisfy the use of hydrogen nuclear magnetic resonance spectroscopy and infrared spectroscopy.

Membrane method user's measurement needs.

---Part 2.Infrared spectroscopy ATR method. The purpose is to meet the measurement needs of users using infrared spectroscopy ATR method.

Styrene-butadiene rubber (SBR)

Determination of the Microstructure of SBR by Solution Polymerization

Part 2.Infrared Spectroscopy ATR Method

Warning---The personnel using this document should have practical experience in formal laboratory work. This document does not indicate all possible safety issues

It is the responsibility of users to take appropriate safety and health measures and to ensure compliance with the conditions stipulated by relevant national laws and regulations.

Note---Some procedures in this document may involve the use or generation of substances that are harmful to the local environment, or may generate waste,

After use, it should be safely handled and disposed of in accordance with the corresponding documents.

1 Scope

This document describes the use of Fourier Transform Infrared Spectroscopy (FTIR) Attenuated Total Reflectance (ATR) for the determination of solution polymerized

styrene-butadiene

The steps of the butadiene microstructure and styrene content in rubber (S-SBR). The styrene content is relative to the mass fraction of the entire polymer.

The content of 1,4-trans structure, 1,4-cis structure, and 1,2-vinyl structure is the mole fraction (%) relative to the butadiene portion.

This document applies to S-SBR raw rubber.

Note 1.For S-SBR containing polystyrene or styrene content greater than 45%, the precision shown in Appendix A may not be obtained.

Note 2.This document uses "vinyl", "trans" and "cis". Usually vinyl, trans and cis are expressed as follows.

--- Vinyl. vinyl unit, vinyl bond, 1,2-unit, 1,2-bond, 1,2-vinyl unit or 1,2-vinyl bond;

---Trans. 1,4-trans unit, 1,4-trans bond, trans-1,4-unit or trans 1,4-bond;

--- cis. 1,4-cis unit, 1,4-cis bond, cis-1,4-unit or cis-1,4 bond.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations

Only the version corresponding to that date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to

This document.

ISO 1795 Natural raw rubber and synthetic raw rubber sampling and sample preparation method (Rubber, rawnaturalandrawsynthetic-

Samplingandfurtherpreparativeprocedures)

3 Terms and definitions

There are no terms and definitions that need to be defined in this document.

4 Principle

The infrared spectrum of S-SBR was obtained by infrared spectroscopy ATR method. According to the corresponding microstructure of butadiene unit and styrene

The absorbance at a specific wavelength, using the formula specified in this document, calculate the content of each component.

5.1 Infrared spectrometer

The infrared spectrum should meet the following conditions.