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GB/T 47279-2026

Nanotechnology - Determination of residual solvent content in [60]/[70] fullerene - Gas chromatography

纳米技术 [60]/[70]富勒烯中残留溶剂含量测定 气相色谱法

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed by the Chinese Academy of Sciences. This document is under the jurisdiction of the National Technical Committee on Standardization of Nanotechnology (SAC/TC279). This document was drafted by: Institute of Chemistry, Chinese Academy of Sciences; Beijing Funacon Biotechnology Co., Ltd.; and CarbonGen Technology (Suzhou) Co., Ltd. The company, Beijing Academy of Science and Technology Analysis and Testing Institute (Beijing Physical and Chemical Analysis and Testing Center), and Chifeng Funakang Biotechnology Co., Ltd. Company, Shenzhen 863 New Materials Technology Co., Ltd., Trina Solar Co., Ltd., CATL (Contemporary Amperex Technology Co., Limited) Company, Kunshan GCL Optoelectronic Materials Co., Ltd., LONGi Green Energy Technology Co., Ltd., Nankai University, National Institute of Metrology, China Standards Standardization Research Institute, Shenzhen Institute of Metrology and Quality Inspection, Wenzhou Yuanxi Biotechnology Co., Ltd., Shenzhen Polytechnic of Information Technology, Shanghai You Ke Instruments & Meters Co., Ltd. The main drafters of this document are. Wang

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Fullerenes are closed, cage-like molecules composed of carbon atoms, belonging to the allotropes of carbon. They were included in China's... Since its inclusion in the cosmetics ingredient catalog, fullerenes have seen increasingly widespread application in the cosmetics field. Furthermore, fullerenes are among the most commonly used components in perovskite solar cells. Electron transport materials are used. However, solvents used in the purification process of fullerenes, such as toluene, xylene, ethanol, and acetone, are relatively strong. Intermolecular interactions can easily leave residues in fullerenes. These residual solvents not only significantly affect the biosafety of fullerenes but also degrade their properties. The efficiency and stability of low-perovskite solar cells are affected. Therefore, both the cosmetics and photovoltaic industries require strict control over the residues in fullerenes. Solvent content. To meet this requirement, a unified and standardized method is needed to accurately determine the residual solvent content in fullerenes. Gas phase. Chromatography is a common technique for determining residual solvents. By optimizing the sample processing methods and gas chromatography parameters for screening fullerenes, the determination of fullerenes can be achieved. Accurate determination of the content of residual toluene, o-xylene, m-xylene, p-xylene, ethanol, acetone, n-pentane, and cyclopentane in alkenes. This document This paper provides a method for determining the residual solvent content in [60]/[70] fullerenes using gas chromatography, aiming to meet the needs of numerous fullerene research and production processes. According to the needs of the application. nano technology [60]/[70] Determination of residual solvent content in fullerenes Gas chromatography Warning. It is essential that users of this document have prior experience in formal laboratory work. This document does not specify all possible safety precautions. All issues. Some testing procedures specified in this document may lead to hazardous situations, and users are responsible for taking appropriate safety and health precautions. Implement it, and ensure that it complies with the conditions stipulated by relevant national laws and regulations.

1 Scope

GB/T 47279-2026 is the Chinese national standard covering the toluene and other solvents trapped in purified fullerene - residues from the extraction and chromatography by which the material is made, which affect both its behaviour in a device and its toxicology. First edition, in force since 1 October 2026. It was issued on 31 March 2026 and takes effect on 1 October 2026, as a first edition. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document describes a gas chromatographic method for determining the residual solvent content in [60]/[70] fullerenes. This document applies to residual toluene, o-xylene, m-xylene, p-xylene, ethanol, acetone, and n-pentane in [60]/[70] fullerenes. Determination of solvent content such as cyclopentane; reference for determination of residual solvent content in other fullerenes, fullerene derivatives, and fullerene composites. implement.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 4946 Gas Chromatography Terminology

GB/T 12808-2015 Laboratory Glassware - Single-mark Pipettes

3 Terms and Definitions

The terms and definitions defined in GB/T 4946 and the following terms and definitions apply to this document. 3.1 [60]fulerene[60]fulerene A molecule composed of 60 carbon atoms has 12 five-membered rings and the rest are closed cage-like polycyclic rings composed of six-membered rings. 3.2 [70]fulerene[70]fulerene The molecule is composed of 70 carbon atoms, with 12 five-membered rings and the rest being closed cage-like polycyclic rings composed of six-membered rings.

4 Principles

4.1 General Rules Quantitative analysis should be performed using either the standard addition method or the external standard method. If the results obtained by the two methods are inconsistent, the result obtained by the standard addition method should prevail. The final result shall prevail.

4.2 Standard Addition Method After the sample was dissolved in 1,2-dichlorobenzene, the residual solvent to be analyzed was injected into the gas chromatograph via a headspace sampler. Hydrogen-fired gas chromatography was used.