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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

SN/T 1690.3-2019

**New textile fiber composition analysis method. Part 3:
Qualitative identification of graphene modified fiber**

新型纺织纤维成分分析方法 第3部分：石墨烯改性纤维的定性鉴别

(English Translation)

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Table of Contents

Foreword
1 Scope
2 Normative references
3 Terms and definitions
3.1 Graphene
3.2 Graphene modified fiber
3.3 Graphene nylon fiber
3.4 Graphene viscose fiber
3.5 Graphene polyester fiber
4 Principle
5 Sample
6 Qualitative analysis
6.1 Microscopy
6.2 Dissolution method
6.3 Raman spectroscopy
7 Test report

Foreword

SN/T 1690 "New Type of Textile Fiber Composition Analysis Method" is divided into 3 parts.

--Part 1: Determination of soybean protein composite fiber content by nitric acid method;

--Part 2: PTT, PBT fiber nuclear magnetic resonance spectroscopy;

--Part 3: Qualitative identification of graphene modified fibers.

This part is part 3 of SN/T 1690.

This part was drafted in accordance with the rules given in GB/T 1.1-2009.

This part is proposed and managed by the General Administration of Customs of the People's Republic of China.

Drafting organizations of this section. Chengdu Customs of the People's Republic of China, Jinan Shengquan Group Co., Ltd., South of the People's Republic of China Chang Customs, Jihua 3509 Textile Co., Ltd.

1 Scope

This part of SN/T 1690 specifies the requirements of graphene-modified nylon fiber, graphene-modified viscose fiber, and graphene-modified polyester fiber.

Qualitative identification method.

This section applies to the qualitative identification of graphene-modified nylon fibers, graphene-modified viscose fibers and graphene-modified polyester fibers.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version is applicable to this file. For undated reference documents, the latest version (including all amendments) is applicable to this document.

GB/T 6682 Analytical laboratory water specifications and test methods FZ/T 01057.1 Textile Chemical Fiber Part 1: General Instructions

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Graphene

Each carbon atom is SP² hybridized with three adjacent carbon atoms to form a honeycomb structure of carbon atom layer.

[T/CGIA 001-2018, definition 2.1]

3.2 Graphene modified fiber

Take other materials as basic raw materials, add graphene, and prepare fiber structure features and graphene functions through different spinning processes Sex as one fiber.

[T/CGIA 002-2018, definition 3.3]

3.3 Graphene nylon fiber

Using polyamide as the basic raw material, through the graphene blending melt spinning process, the nylon fiber structure characteristics and graphene function are prepared.

A fiber that integrates performance.

[T/CCFA 01034-2017, definition 3.1]

3.4 Graphene viscose fiber

Graphene is blended with cellulose fiber pulp as the basic raw material, and the wet spinning process is used to prepare viscose staple fiber structure.

It is a fiber that combines the functional properties of graphene.

[T/CCFA 01032-2017, definition 3.1]

3.5 Graphene polyester fiber

Using polyester (PET) as the basic raw material, through the graphene blending melt spinning process, the preparation has the structural characteristics of polyester fiber and graphite A fiber with ene functionality as a whole.

[T/CCFA 01031-2017, definition 3.1].

4 Principle

According to the different physical and chemical properties of the graphene modified fiber, different analysis methods are used, and the test results are compared with Appendix A~Record D for qualitative analysis.

5 Sample

The sampling and preparation of the sample shall be carried out in accordance with the provisions of FZ/T 01057.1.

6.1.1 Test instruments and tools

Hastelloy slicers, slides, coverslips, biological microscopes.

6.1.2 Reagents

Liquid paraffin.

6.1.3.1 Longitudinal observation

Tear the sample into thin bundles and arrange them in order, take a sample of appropriate length, place it on a glass slide, add a small amount of liquid paraffin, and cover with a cover glass Place it on the stage of a biological microscope of 100 times to 500 times to observe its shape, and record the longitudinal characteristics of the sample.

6.1.3.2 Cross-sectional observation

Place the cross-section of the sample prepared with the Hastelloy microtome on a glass slide, add a small amount of liquid paraffin, and cover with a cover glass (be careful not to bring in air bubbles), place it on the stage of a biological microscope at 100 to 500 times to observe its shape, and record the cross-sectional characteristics of the sample.

6.1.4 Identification

Refer to Appendix A, and refer to Appendix C and Appendix D for identification.

6.2.1 Test instruments and tools

6.2.1.1

Thermometer (0°C~100°C).

6.2.1.2

Analytical balance (sensitivity 1 mg).

6.2.1.3

Electric heating constant temperature water bath (30°C~100°C).

6.2.1.4

Electric furnace, glass suction filter bottle, beaker, test tube, tweezers, glass rod, crucible tongs.

6.2.2 Reagents

Unless otherwise specified, all reagents used are of analytical grade. The water is Grade 3 water specified in GB/T 6682.

Concentrated sulfuric acid (with a density of 1.83 g/L at 20 °C), concentrated hydrochloric acid (with a density of 1.18 g/L at 20 °C), concentrated nitric acid (with a density of 1.40 g/L at 20 °C), Formic acid (density 1.12 g/L at 20 °C), hydrofluoric acid (density 1.15 g/L at 20 °C), sodium hydroxide, N-dimethylformamide, dimethyl formamide Sulfoxide, sodium hypochlorite, cyclohexanone, cuproamine, glacial acetic acid, acetone, tetrahydrofuran, potassium thiocyanate, phenol, copper cyclohexanone, acetonitrile, pyridine Pyridine, carbon tetrachloride, dichloromethane, dioxane, ethyl acetate.

6.2.3 Test method

Put about 100 mg of sample in a test tube, and inject 10 mL of reagent (the bath ratio of sample to reagent is 1.100). At room temperature, use glass Stir the rod for 5 minutes and observe the dissolution of the reagent on the sample. Samples that are difficult to dissolve at room temperature need to be boiled and stirred with a glass rod Move for 3 min,