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

GB/T 44542-2024

**Determination of ash and impurity content in carbon fibre and
its precursor**

碳纤维及其原丝灰分和杂质成分的测定

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Table of Contents

- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 4 General
- 4.1 Instrument
- 4.1.1 Analytical balance. accurate to
- 4.2 Reagents and materials

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 for standardization documents" Drafting is required. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document is proposed and coordinated by the National Technical Committee on Carbon Fiber Standardization (SAC/TC 572). This document was drafted by: Nanjing Fiberglass Research and Design Institute Co., Ltd., Zhongfu Shenyang Carbon Fiber Co., Ltd., Anhui Jialiqi Advanced Composite Materials Technology Co., Ltd., Jiangsu Hengshen Co., Ltd., Sinopec Shanghai Petrochemical Co., Ltd., Beijing Aviation Industry Co., Ltd. China University of Aeronautics and Astronautics, Jilin Carbon Valley Carbon Fiber Co., Ltd., Jilin Guoxing Carbon Fiber Co., Ltd., Shanghai Aircraft Manufacturing Co., Ltd., China Academy of Science and Technology Ningbo Institute of Materials Technology and Engineering, Xinjiang Longju New Materials Co., Ltd., Hangzhou Weiken New Materials Technology Co., Ltd., Xinchuang Carbon Valley Group Co., Ltd., Changzhou Institute of Technology, Zhejiang Hengyida Composite Materials Co., Ltd., Beijing University of Chemical Technology, Sichuan Aerospace Fenghuo Servo Control Technology TECHNOLOGY LIMITED. The main drafters of this document are. Jiang Lu, Chu Chenjing, Guo Mei, Yu Congcong, Wang Fen, Liu Liang, Lu Qiang, Wang Yefang, Wang Ling, Fu Fengzhi, Xin Meiyin, Song Peng, Song Dewu, Lu Ming, Li Guocai, Li Dehong, Zhong Junjun, Ma Xianglin, Tang Bo, Tan Yuan, Wu Zeyang, Lu Tao, Gao Aijun, Zheng Peiqi, and Song Nan. Carbon fiber and its precursor ash content and Determination of impurities

1 Scope

China's national method for determining the ash and impurity content of carbon fibre and its

precursor. Carbon fibre is made by stabilising and carbonising a polyacrylonitrile precursor at temperatures above 1000 degrees C, and the inorganic content of that precursor survives the process as ash - metal oxides and salts left from the polymerisation catalysts, the spinning bath, the finish, and whatever the fibre picked up in handling. That residue matters out of proportion to its quantity. Inorganic particles interrupt the graphitic structure and act as flaws from which fracture initiates, so ash content correlates directly with the strength the fibre achieves; sodium and other alkalis catalyse oxidation and reduce the fibre's high temperature stability; and metallic residues are unacceptable in the electronic and aerospace applications that pay the most for the fibre.

This document describes the determination of ash, silicon, potassium, sodium, calcium, magnesium, iron, aluminum and titanium impurity content in carbon fibers and their precursors. method. This document applies to carbon fiber tow, filament, short fiber and woven fabrics, braided fabrics and other carbon fiber products, and also applies to carbon fiber Raw silk.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies. in this document.

GB/T 6682 Specifications and test methods for water used in analytical laboratories

GB/T 8170 Rules for rounding off values and expression and determination of limit values

GB/T 40724 Terminology of carbon fiber and its composite materials

3 Terms and definitions

The terms and definitions defined in GB/T 40724 apply to this document.

4.1.1 Analytical balance. accurate to

0.1 mg.

4.1.2 Muffle furnace. Maximum temperature shall not be less than 1.200 °C, with a temperature control accuracy of ± 25 °C.

4.1.3 Oven. Maximum temperature shall not be less than 300°C, with a temperature control accuracy of ± 2 °C.

4.1.4 Crucible. platinum crucible or porcelain crucible, with lid, capacity 20 mL to 50 mL.

4.1.5 Flame atomic absorption spectrometer (hereinafter referred to as AAS) with

potassium, sodium, calcium, magnesium and iron hollow cathode lamps.

4.1.6 Inductively coupled plasma optical emission spectrometer (hereinafter referred to as ICP).

4.1.7 Inductively coupled plasma mass spectrometer (hereinafter referred to as ICPMS).

4.1.8 Ultraviolet spectrophotometer, equipped with quartz cuvette.

4.1.9 Low temperature heating plate.

4.2 Reagents and materials

4.2.1 Water. Conform to the requirements of Grade 1 water in GB/T 6682.

4.2.2 Argon. purity not less than 99.99% (volume fraction) or liquid argon.

4.2.3 Nitrogen. purity not less than 99.99% (volume fraction).

4.2.4 Acetylene. purity not less than 99.99% (volume fraction).