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**Nanotechnology - Nanogenerator - Part 2: Test methods for
electric performance of triboelectric nanogenerators**

纳米技术 纳米发电机 第2部分：摩擦纳米发电机电性能测试方法

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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 for standardization documents" Drafting.

This document is part 2 of GB/T 45525 "Nanotechnology Nanogenerators". GB/T 45525 has been published in the following parts.

- Part 1: Terminology;
- Part 2: Test methods for electrical performance of triboelectric nanogenerators.

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 was proposed by the Chinese Academy of Sciences.

This document is under the jurisdiction of the National Nanotechnology Standardization

Technical Committee (SAC/TC279).

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Introduction

A nanogenerator is an energy converter that converts external energy into electrical energy through nanomaterials, nanostructures or at the nanoscale.

Nanogenerators include friction nanogenerators, piezoelectric nanogenerators, pyroelectric nanogenerators, etc. Among them, friction nanogenerators have With advantages such as wide selection of materials, light weight, low frequency and high efficiency, it has developed rapidly in the fields of micro/nano energy, self-driven sensing, blue energy and high voltage power supply.

All of them have broad application prospects. GB/T 45525 "Nanotechnology Nanogenerator" is planned to consist of three parts.

- Part 1: Terminology. The purpose is to establish a unified terminology system for nanogenerators to help standardize the terms used in various disciplines and industries. Communication between people.

- Part 2: Test method for electrical performance of triboelectric nanogenerators. The purpose is to establish an instrument for testing the electrical performance of triboelectric nanogenerators.

Requirements for equipment, environmental control, test methods and efficiency calculation methods.

- Part 3: Test method for service life of triboelectric nanogenerator. The purpose is to establish a test method for service life of triboelectric nanogenerator Instrument requirements, environmental control, test methods and related regulations for accelerated life testing.

Electrical performance is the basic and core performance indicator of triboelectric nanogenerators.

Electromagnetic generators, based on the unique properties of triboelectric nanogenerators and their diverse types and structures, develop a unified and accurate test method to Characterizing the electrical properties of different friction nanogenerators is of great significance for guiding, standardizing and accelerating the development of the field of friction nanogenerators. Nanotechnology Nanogenerator Part 2: Test methods for electrical performance of triboelectric nanogenerators

1 Scope

This document describes the test method for the electrical performance of triboelectric nanogenerators, including the principle, test environment, reagents or materials, instruments and equipment, Samples, test procedures, data processing, sources of uncertainty and test reports.

This document is applicable to the electrical performance test of triboelectric nanogenerators.

2 Normative references

GB/T 2900.1

GB/T 6682

GB/T 30544.1

GB/T 45525.1

3 Terms and definitions

The terms and definitions defined in GB/T 2900.1, GB/T 30544.1 and GB/T 45525.1 and the following apply to this document.

3.1 [Source. GB/T 45525.1-2025, 4.2]

A nanogenerator that converts external mechanical energy into electrical energy using the triboelectric effect.

3.2 Output voltage-charge curve outputvoltage-chargecurve

The relationship curve between the output voltage and charge of the friction nanogenerator during one working cycle.

Note. The integral of the curve is the energy output of a single cycle of the triboelectric nanogenerator.

3.3

Energy output of a triboelectric nanogenerator during one operating cycle. Note. The unit is joule (J).

3.4

Maximum energy output of a triboelectric nanogenerator in one cycle.

Note 1. The output voltage of the triboelectric nanogenerator is the open circuit voltage, and the output charge is the output charge under short circuit conditions.

The cycle energy output reaches its maximum value. Note 2. The unit is joule (J).

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