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Nanotechnology - Nanogenerator - Part 1: Terminology

纳米技术 纳米发电机 第1部分：术语

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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 plan of standardization documents" Drafting.

This document is part 1 of GB/T 45525 "Nanotechnology-based 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 and has made great achievements in the fields of micro/nano energy, self-driven sensing, blue energy and high voltage power supply.

It has a wide range of 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.

At present, there are great differences in the classification and terminology of nanogenerators. A unified terminology will greatly improve the technical level of this field.

It plays a guiding and promoting role in the development of the industry.

Nanotechnology. Nanogenerators. Part 1: Terminology

1 Scope

This document defines terms and definitions related to nanogenerators.

This document applies to the research, development and related applications of nanogenerators.

2 Normative references

This document has no normative references.

3.1 Nanoscale

The size range is between 1nm and 100nm.

NOTE 1 This size range generally, but not exclusively, exhibits properties that cannot be extrapolated from larger sizes. For these properties, the upper and lower limits are Approximate.

Note 2. The purpose of introducing a lower limit (about 1 nm) in this definition is to avoid the default of a single or small cluster of atoms being considered a nano-object or nano-object when no lower limit is set. Nanostructured units.

[Source. GB/T 30544.1-2014, 2.1]

3.2 Nanomaterials

Materials whose external dimensions, internal or surface structures are on the nanometer scale (3.1).

Note 1 to entry. This generic term includes nano-objects and nano-structured materials.

Note 2. See engineered nanomaterials, manufactured nanomaterials and associated nanomaterials.

[Source. GB/T 30544.1-2014, 2.4]

3.3 Nanostructure

One or more interconnected components that are partially in the nanoscale region (3.1).

Note. Regions are defined by boundaries that are discontinuous in nature.

[Source. GB/T 30544.1-2014, 2.6]

4.1 Nanogenerator; NG

An energy converter that converts external energy into electrical energy through nanomaterials (3.2), nanostructures (3.3) or at the nanoscale (3.1).

Note. Nanogenerators include friction nanogenerators (4.2), piezoelectric nanogenerators (4.3), pyroelectric nanogenerators (4.4), and composite nanogenerators (4.5) Etc. The theoretical origins and basic physical mechanisms of electromagnetic generators and nanogenerators are compared in Appendix A.