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**Nanotechnologies - Antibacterial silver nanoparticles -
Specification of characteristics and measurement methods**

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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 equivalent to ISO /T S20660:2019 "General Principles for Characteristics and Measurement Methods of Nanotechnology Antibacterial Silver Nanoparticles":

The type is adjusted from the ISO technical specification to the national standard of our country:

The following minimal editorial changes have been made to this document:

--- References reordered:

Please note that some contents of this document may refer to patents: The issuing agency 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 Nanotechnology Standardization Technical Committee (SAC/TC279):

The main drafting units of this document: National Nanoscience Center, China Institute for Food and Drug Control, Basic Medical Research Institute of Chinese Academy of Medical Sciences

Institute:

Introduction

Silver nanoparticles have antimicrobial properties and become one of the most widely used nanomaterials in consumer products: Silver nanoparticles are increasingly

Used in consumer products to control microbial growth on or within the product: When silver nanoparticles interact with microorganisms, they release

silver ions: These silver ions may affect and damage microorganisms in different ways: However, the mechanism of the bactericidal effect is not fully understood [17]:

Several possible antibacterial mechanisms have been proposed in the literature: 1) The positively charged silver ions released from silver nanoparticles can quickly bind to the sulfhydryl groups on the bacterial surface

2) Ingested silver ions or small nanoparticles can interfere with ATP synthesis and DNA replication:

3) Silver nanoparticles and silver ions can generate reactive oxygen species leading to oxidative damage [18-20]: For other scientific evidence for the antibacterial properties of silver nanoparticles, see

Appendix B: The antibacterial activity of silver nanoparticles is related to their physicochemical properties:

Although there are many antimicrobial products containing silver nanoparticles on the market, most of them are sold without the physical and chemical properties of the nanoparticles

and antimicrobial properties: At present, most manufacturers provide characteristic indicators based on practical experience:

Based on reference to other standards for antimicrobial silver nanoparticle powders and colloids in the field of nanotechnology, this document provides

Guidelines for grain characterization indicators and recommended methods of measurement: The main measurement methods recommended in this document can be used for industry specific parameter determination: This article

The software summary selects the currently commonly used measurement methods, so it needs to be updated in due course:

Nanotechnology Antibacterial Silver Nanoparticles

General rules for characteristics and measurement methods

1 Scope

This document provides guidance on the characteristic indicators and related measurement methods of antibacterial silver nanoparticle powder or colloid:

This document is intended to help manufacturers provide buyers with information such as the physicochemical properties of silver nanoparticles with antimicrobial effects:

This document does not contain specific health and safety considerations during manufacture or use:

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text: Among them, dated references

For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to

this document:

ISO /T S80004-1:2010 Nanotechnology terms Part 1: Core terms
(Nanotechnologies-Vocabulary-

Part 1:Coreterms)

Note: GB/T 30544:1-2014 Nanotechnology Terminology Part 1: Core Terms (ISO /T S80004-1:2010, IDT)

ISO /T S80004-2:2015 Nanotechnology Terminology Part 2: Nanoobjects
(Nanotechnologies-Vocabulary-

Part 2: Nano-objects)

3 Terms and Definitions

ISO 26824, ISO /T S80004-1:2010 and ISO /T S80004-2:2015 and the following terms and definitions apply to this

document:

3:1

silver nanoparticle silvernanoparticle

Nanoparticles composed of silver whose external dimensions are all in the nanometer scale in all three dimensions:

[Source: ISO /T S80004-2:2015, 4:1, with modifications]

3:2

primary particle primaryparticle

Particles of primary origin in aggregates (3:4) or aggregates (3:5) or mixtures of both:

Note 1: In some natural states, agglomerates or mixed particles of aggregates may be primary particles, but usually mixed particles are aggregates:

Note 2: Agglomerates and aggregates are also called secondary particles:

[Source: ISO 26824:2013,1:4]

3:3

nanoscale nanoscale

In the size range of 1nm~100nm:

NOTE: This size range usually, but not exclusively, exhibits properties that cannot be extrapolated from larger sizes:

[Source: ISO /T S80004-1:2010,2:1]