Chinastandards.org

ICS 19.120
CCS A 28

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

chinastandards.org - PREVIEW

GB/Z 42353-2023

Guidelines for good practices in zeta-potential measurement

Issued on: March 17, 2023 **Implemented on: October 1, 2023**

Issued by: State Administration for Market Regulation, China National Standardization Administration

Preview: page 1 of 5 shown, full document available. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-z-42353-2023

Chinastandards.org

Table of Contents

Preface
Introduction
1 Scope 1
2 Normative references 1
3 Terms and Definitions 1
4 symbols 1
5 Principle 1
6 Sample preparation 2
6.1 Overview 2
6.2 Sampling and sample inspection 2
6.3 Sample dilution step 2
6.4 Stability test of samples 3
7 Uncertainty of measurement and sources of error 3
7.1 Overview 3

chinastandards.org · PREVIEW

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 R19997.2018 "Guidelines for Zeta Potential Measurement Operation", and the document type is adjusted by the ISO technical report

It is the national standardization guiding technical document for our country.

Please note that some contents of this document may refer to patents. The issuer of this document does not assume responsibility for identifying patents.

This document was proposed and managed by the National Particle Characterization and Sorting and Sieve Mesh Standardization Technical Committee (SAC/TC168).

This document is drafted by. Shandong University of Technology, Shanghai Institute of Metrology and Testing Technology, China Machine Productivity Promotion Center Co., Ltd., Henan

Zhongke Intelligent Manufacturing Industry R&D Center Co., Ltd.

Preview: page 2 of 5 shown, full document available. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-z-42353-2023

Introduction

Zeta potential is commonly used to study the isoelectric point (IEP) and surface adsorption of particle dispersions in liquid media, and as a comparison of different

It is an indicator of the electrostatic dispersion stability of the product. Zeta potential is not a directly measurable quantity, but one determined using appropriate theory. In addition, Zeta

The potential is not an intrinsic property of suspended particles, but depends on particle and medium properties, and their interactions at the interface. medium

Any changes in the chemical composition and ion concentration will affect this interfacial equilibrium and thus affect the zeta potential. Therefore, the samples were prepared and measured

process will affect the measurement results. Wrong sample preparation and measurement process, or incorrect application of theoretical models to calculate Zeta current from measurement results

, usually leading to erroneous results.

This document provides guidelines for sample preparation and measurement procedures for the determination of zeta potential using optical electrophoretic mobility or electroacoustic methods.

Operation Guide for Zeta Potential Determination

1 Scope

This document provides information on the application areas of Zeta Electric for the design of new products, the optimization of existing products, the quality control of processes and/or product applications, etc.

Position determination operation guide.

This document does not provide a complete procedure for the determination of zeta potential.

The instructions and points mentioned in this document can be used to perform the zeta potential determination specified in ISO 13099-1 and ISO 13099-2.

2 Normative references

This document has no normative references.

3 Terms and Definitions

This document does not have terms and definitions that need to be defined.

Preview: page 3 of 5 shown, full document available. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-z-42353-2023

4 symbols

The following symbols apply to this document.

μ electrophoretic mobility

epsilonm Relative permittivity of the medium

zeta electrokinetic potential, Zeta potential

etao medium viscosity

5 principles

Zeta potential (zeta) is the potential at the imaginary shear plane, which is the interface between solvent molecules attached to the particle surface and the solvent.

Zeta potential is often used to predict the stability of suspensions, or the adhesion of suspended particles to macroscopic surfaces (eg, cellulose fibers, films).

This is because the interaction between particles or between particles and surfaces or between particles and proteins depends on the distribution of ions in the diffusion layer, which is related to Zeta

Potentials are closely related. When electrostatic forces between particles or between particles and a surface are dominant, the zeta potential is the main factor for evaluating these interactions.

To parameter [1]. When the surfaces have a large number of identical charges, the surfaces repel each other. When there is no charge on the surface, or there is an opposite charge between the surfaces, or the surface

Surfaces attract each other when positively and negatively charged regions exist between them. The higher the absolute value of Zeta potential, the stronger the repulsion between suspended particles.

Stronger, the colloidal suspension tends to be more stable. The lower the electrolyte content, the thicker the electric double layer and the more stable the suspension. Conversely, the absolute value of Zeta potential

(Positive or negative) The lower the electrolyte (ion) concentration, the more cohesive the suspension. Therefore, the zeta potential is mainly used to predict the

Stability, the stability of the suspension is often related to pH and/or various electrolytes and surface active ions (such as ionic surfactants, multivalent ions and

The concentration of polymer electrolyte) is related to [2][3].

Zeta potential can be measured by the relative motion of the liquid medium and particles.

chinastandards.org · PREVIEW

Preview: page 4 of 5 shown, full document available. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-z-42353-2023

Usually electrophoretic or electroacoustic methods are used to determine the different samples (such as particle

Zeta potential of colloidal suspensions with particle diameters ranging from a few nanometers to tens of microns and volume concentrations ranging from 10-4% to 40% [4].

Zeta potential is not an intrinsic property of particles, but depends on the chemical equilibrium between the particle surface and the liquid phase of its dispersion medium. medium

chinastandards.org · PREVIEW

Preview: page 5 of 5 shown, full document available. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-z-42353-2023