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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Analysis of the zeta potential of colloids - Electrophoresis guidelines

胶体颗粒zeta电位分析 电泳法通则

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Foreword

This standard is drafted in accordance with the rules given in GB/T 1.1-2009. This standard is proposed by the Chinese Academy of Sciences. This standard is under the national standard of nanotechnology standardization technical committee (SAC/TC279). The main drafting of this standard. National Center for Nanoscience, East China Normal University. The main drafters of this standard. Liu Dunxiao, Ma Shiyu, Ge Guanglu, Chen Banglin, Jiang Chao, Zhang Yunyan, Gao Jie.

Many of the important properties of the colloidal system are directly or indirectly determined by the charge (or potential) of the colloidal particles. The ions in the colloidal system The adsorption of dipole molecules affects the distribution of charge (or potential) of colloidal particles, while the distribution of charge (or potential) also affects ions or even Polymeric adsorption. The charge (or potential) distribution determines the interaction energy between the colloidal particles and, in many cases, the colloid The aggregation stability and flow behavior of the system. The properties of the colloidal system are therefore typically analyzed and interpreted by measuring the electrical properties. For the charged particles suspended in the liquid medium, in addition to the surface chemical composition, the surface charge and surface morphology (especially the former) is two The most important surface characteristics. Reflecting the surface charge properties of the colloidal system that zeta potential, the zeta potential of the absolute value of the size of the colloid The direct reflection of stability is a key factor in the preparation, destruction and application of colloidal systems. By measuring or regulating zeta Potential can monitor and control the behavior of colloidal systems, so zeta potential in scientific research, industrial production and other fields have a wide range of applications. For example, in the paint industry, the accumulation of pigment particles will affect the quality of color, reduce the gloss and texture of the spray, through the monitoring and adjustment of paint Of the zeta potential so that the particles in the coating is well dispersed and successfully sprayed; in the paper industry, the detection of fiber and filler surface zeta potential, Can effectively assist in the addition of chemical additives; in addition, zeta potential in the adsorption, bio-medicine, brewing, ceramics, pharmaceutical, mineral processing and water And other industries are also extremely important parameters. zeta potential measurement methods are electrophoresis, electroosmosis, flow potential method and electro-acoustic method

(ultrasonic method), which by electrophoresis Most common. This standard specifies the general code for the measurement of zeta potentials in colloidal systems using electrophoresis. Colloidal particles zeta potential analysis electrophoresis general rule

1 Scope

China's national general rules for analysing the zeta potential of colloidal particles by electrophoresis. It specifies the terms, symbols, principle, the zeta potential itself, its determination, the sources of uncertainty and the test report, with informative annexes on the conditions under which the Smoluchowski theory applies, on the Debye length, on worked measurement examples by electrophoretic light scattering and by microelectrophoresis, and on the test report format. Its introduction states the case for the measurement clearly. Many of the important properties of a colloidal system are determined directly or indirectly by the charge, or potential, of its particles. The adsorption of ions and dipolar molecules affects how that charge is distributed, and the distribution in turn affects further adsorption; and the charge distribution determines the interaction energy between particles and therefore, in most cases, the aggregation stability and the flow behaviour of the whole system. For a charged particle suspended in a liquid, surface charge and surface morphology are the two most important surface characteristics after composition, and it is the surface charge that zeta potential reflects. The absolute value of the zeta potential is a direct indication of colloidal stability - a suspension whose particles carry enough like charge repel one another and stay dispersed, and one whose potential is near zero flocculates. That makes the measurement central wherever a suspension has to be made, kept or deliberately broken: paints, inks, ceramic slips, pharmaceutical formulations, water treatment, mineral processing and food emulsions all depend on it. Issued on 25 April 2016 and in force since 1 November 2016.

This standard specifies the general rules for the determination of zeta potentials of colloidal particles by electrophoresis. This standard is applicable to zeta potential analysis of ideal hardball colloidal particles with water as the dispersion medium and smooth surface, non-ideal hard gel Particle and soft ball colloidal particles of the zeta potential analysis can also refer to the implementation.

2 Normative reference documents

The following documents are indispensable for the application of this document. For dated references, only the dated edition applies to this article Pieces. For undated references, the latest edition (including all modifications) applies to this document. Sample preparation - Dispersion method for powders in liquids

ISO 13099-1..2012 colloid system zeta potential measurement method - Part 1. Electroacoustic and electrokinetic phenomena (Coloidalsys-tems-Methodsforzeta-potentialdetermination-Part 1.

Electroacousticandelectrokineticphenome- na)

ISO 13099-2..2012 colloid system zeta potential measurement method - Part 2. Optical method (Coloidalsystems- Methodsforzeta-potentialdeterminatin-Part 2. Opticalmethods) 3 terms and definitions, symbols

3.1 Terms and definitions The following terms and definitions apply to this document.

3.1.1 Surface charge density The amount of charge generated at the interface per unit area due to the specific adsorption of the liquid phase ions or the dissociation of the surface groups.

Note. The unit is Coulomb per square meter (C/m2).

3.1.2 Surface potential electricsurfacepotential Psi

0 The potential difference between the particle surface and the uniform liquid phase.

Note. quoted from

ISO 13099-2..2012, defined 3.1.3.

3.1.3 Slipping plane; When the particles move in the electric field, under the action of the shear stress, the liquid near the solid-liquid interface moves with respect to the surface Elephant.

Note. cited from

ISO 13099-2..2012, defined 3.1.9.