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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Good practice for dynamic light scattering(DLS) measurements

动态光散射法 (DLS) 测量操作指南

(English Translation)

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Foreword

This document is a report-type guidance technical document.

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents". Drafting.

This document is equivalent to ISO /T R22814.2020 "Guide to Operation of Dynamic Light Scattering (DLS) Measurements", and the document type is changed from ISO technical standard.

The technical report has been adjusted to become a national standardization guiding technical document in my country.

Introduction

Dynamic light scattering (DLS) is a widely used characterization technique for particles with equivalent hydrodynamic diameters in the submicron range. Modern instruments allow... While some users may have received limited training or lack background knowledge, the problem is that not all users are familiar with the technology.

The potential flaws and limitations of the results, and how to interpret them correctly.

Therefore, this document is formulated as an operational guide for dynamic light scattering measurements and as part of GB/T 29022-2021 "Dynamic Particle Size Analysis".

1 Scope

This document provides a guide to measurement and result interpretation using dynamic light scattering (DLS) technology, outlining how to perform measurements appropriately.

Information such as sample preparation methods, how to verify instrument operation, and how to correctly interpret data (including data quality assessment methods) is extensive.

GB/T 29022-2021 provides guidelines for measurement.

This document is intended to assist users in planning experiments for measurements of solid particles, emulsions, and bubbles, particularly regarding how to obtain the necessary samples.

For information and to determine whether DLS is the most suitable detection method, the focus should be on the practical operations required to obtain high-quality DLS measurement results.

It focuses on steps rather than theoretical discussions.

2 Normative references

This document has no normative references.

3 Terms and Definitions

This document does not contain any terms or definitions that need to be defined.

4.1 Overview

Discussing best operating guidelines requires understanding the type of instrument used. Different optical configurations require different adjustment methods to control light transmission.

Different signal processing techniques require different methods to adjust background conditions; different analysis techniques require different conditions of the signal being processed.

Parameters. Two commonly used types are zero-error detection using correlation function processing (see 9.2 of GB/T 29022-2021) and using frequency... Heterodyne detection for power spectrum processing (see 9.3 of GB/T 29022-2021).

Furthermore, the best operating guidelines related to the instrument type also depend on

the scattering angle used for the measurement. For example, large particle impurities typically produce... Forward scattering at a large angle is stronger than that at a large angle. Therefore, when measuring a sample using the forward scattering angle, it is usually necessary to carefully observe the sample before adding it.

The cleanliness of the cuvettes is ensured, large particle sizes are filtered out, and only the particle size distribution (PSD) of interest in the sample is retained. The injection filter is then discarded.

The first few drops of sample are used to remove filter residue. Furthermore, when the scattering angle is known to be close to 180° , higher-order scattering from high-concentration samples can be well observed.

Since the relaxation time is approximately equal to that of a single scattering event, backscattering can be used to characterize high-concentration media, provided that the volume scattering loss can be avoided.

Sample density. Many commercial instruments use optical, mechanical, or optomechanical means to move the optical detection point closer to the cuvette wall.

4.2.1 Sample Information

Customers or submitters of DLS-analyzed samples should provide as much information as possible related to the sample measurements. A lack of information does not preclude analysis.