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

GB/T 42658.3-2025

**Surface chemical analysis - Sample handling, preparation and
mounting - Part 3: Biomaterials**

表面化学分析 样品处理、制备和安装 第3部分：生物材料

(English Translation)

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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 Part 3 of GB/T 42658. GB/T 42658 has published the following parts.

--- Sample treatment, preparation and mounting for surface chemical analysis Part 3: Biological materials.

--- Guide for sample handling, preparation and installation for surface chemical analysis Part 4: Reporting of nano-object-related information prior to surface analysis History, preparation, handling and installation information.

This document is equivalent to ISO 20579-3:2021 "Sample processing, preparation and mounting for surface chemical analysis Part 3: Biological materials material".

Introduction

GB/T 42658 is an equivalent to ISO 20579 and is intended to provide analysts and practitioners with comprehensive information on sample handling, storage, and installation.

Provide guidance to scientific researchers in surface chemical analysis.

GB/T 42658 is intended to consist of four parts.

--- Sample handling, preparation and installation for surface chemical analysis Part 1: Recording and reporting sample handling before analysis.

This document specifies a method for recording and reporting sample preparation prior to surface chemical analysis that is applicable to all substances, but not to specific Duplicate in the analysis file for the specified substance.

--- Sample handling, preparation and installation for surface chemical analysis Part 2: Preparation and installation of samples for recording and reporting analysis. Purpose the purpose of this document is to establish methods for recording and reporting analysis of sample preparation and mounting for surface chemical analysis of all substances, except Methods are not repeated in the analysis file for a specific substance.

--- Surface chemical analysis sample processing, preparation and installation Part 3:

Biological materials. The purpose is to determine the the method of sample handling, preparation and mounting for surface chemical analysis shall not be repeated in the analysis documentation.

--- Guide for sample handling, preparation and installation for surface chemical analysis
Part 4: Reporting of nano-object-related information prior to surface analysis the purpose is to define a method for reporting the phase relationship of nano-objects prior to surface chemical analysis that is applicable to all substances.

methods of origin, preparation, processing and installation of information.

The methods described in this document are mainly for Auger electron spectroscopy (AES), X-ray photoelectron spectroscopy (XPS) and secondary ion mass spectrometry the sample handling, preparation and mounting methods are suitable for surface analytical techniques such as SIMS, but can also be used for many other surface sensitive analytical techniques such as Electron scattering spectroscopy, scanning probe microscopy, low energy electron diffraction and electron energy loss spectroscopy. Sample manipulation may affect the performance of surface sensitive analytical techniques.

AES, XPS and SIMS are sensitive to surface layers a few nanometers thick, which may be affected by the sample before it is sent to the analysis chamber.

Therefore, proper handling and preparation are crucial for reliable analysis.

Can lead to changes in surface composition and unreliable data.

This document is specifically designed to assist analysts with sample handling, preparation, and mounting methods for surface chemical analysis of biological materials.

The applications of synthetic materials in the human body include metals, ceramics, polymers, glass, carbon and composites.

Techniques such as AES, XPS and SIMS are used to analyze inorganic materials, but the methods described can also be used for biological materials.

Many other surface-sensitive analytical techniques can be used for sample analysis, such as ion scattering spectroscopy, low-energy electron diffraction, and electron energy loss spectroscopy.

Examples of material applications include artificial hip and knee joints, bone plates for fracture fixation, dental implants, optical devices (intraocular lenses), heart valves and cardiovascular the study of vascular systems and membrane materials for guided tissue regeneration. Further examples are discussed [1][2].

Sample processing can affect surface sensitive measurements. Surface chemical analysis methods are usually performed on surface layers that are only a few nanometers thick.

It may be seriously affected by improper handling[4][7] or surface treatment necessary

before placement in the analysis chamber. Proper sample handling and preparation are crucial.

This is particularly critical for the analysis of biological materials, as failure to do so can result in altered surface composition and unreliable data.

Proper sample preparation and mounting are particularly critical for surface chemical analysis of biological materials, as failure to do so may result in changes in surface composition and undesirable Reliable analysis. Careful handling of samples to avoid or minimize the introduction of contaminants.

Maintain the original surface condition so that the analysis is still on the original specimen surface. This document describes the methods that surface analysts may need to use.

method to minimize the impact of sample preparation when using any method.

In addition, changes in the surface composition of biomaterials before and after implantation may be a problem related to contamination.

The general idea is to specifically address solid surfaces, but also soft surfaces such as self-assembled monolayers (SAMs), hydrogels, scaffolds, and certain polymers.

Surface chemical analysis sample processing, preparation and Installation Part 3: Biological Materials

1 Scope

This document provides guidance on handling, mounting, and surface preparation methods for biological material samples prior to surface chemical analysis.

Helps analysts understand the conditions required to process special samples using the following techniques when performing analysis.

---X-ray photoelectron spectroscopy (XPS) or electron spectroscopy for chemical analysis (ESCA);

---Secondary ion mass spectrometry (SIMS);

---Auger Electron Spectroscopy (AES).

The proposed method is also applicable to other techniques that are sensitive to surface composition analysis, such as.

---Attenuated total reflectance Fourier transform infrared spectroscopy (ATR-FTIR);

---Total reflection X-ray fluorescence spectroscopy (TXRF);

---Ultraviolet photoelectron spectroscopy (UPS).

This document describes the effects of the vacuum conditions used and the contamination