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

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**Surface chemical analysis - Near real-time information from the X-ray
photoelectron spectroscopy survey scan - Rules for identification of, and
correction for, surface contamination by carbon-containing compounds**

表面化学分析 X射线光电子能谱全扫描谱的准实时信息 含碳化合物表面污染的识别和校正规则

(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 equivalent to ISO 22581:2021 "Surface chemical analysis - Quasi-real-time information content of full-scan X-ray photoelectron spectroscopy" Rules for the identification and correction of surface contamination by carbon compounds.

Introduction

The basis of X-ray photoelectron spectroscopy is to irradiate the sample surface with soft X-rays and examine the excited emission in the form of photoelectrons and Auger electrons.

In its most widely used mode, the X-ray beam density is low and the irradiation area is large. Therefore, this technology is generally regarded as a this paper analyzes one of the least disruptive technologies among the existing "beam" technologies. The use of this technology is becoming more and more widespread, enabling accurate information

retrieval.

The establishment of a set of rules for the implementation of these regulations has become important, and this document helps to meet that need.

In many cases, the surface to be analyzed will have a contamination film attached to it, which is usually organic in nature and is formed by atmospheric this film can cause different degrees of distortion in different areas of the spectrum due to molecular adsorption, surface exposure to the working or test environment, or the spectrometer itself.

Therefore, it is necessary to correct and eliminate this effect for the surface composition analysis of the substrate.

The described procedure can identify the presence of carbonaceous contamination, estimate its thickness, and remove its effect on the determination of surface composition.

is an important part of data reduction in the quantitative evaluation of XPS full scan spectra. This can be automated within a data system and it is a necessary first step in providing a means of automatically retrieving information from full scan spectra for techniques that rely on surface analysis.

The procedures described are based solely on the conclusions of the 22nd [9] and 34th [10] International Union of Vacuum Science, Technology and Applications Symposiums.

The X-ray photoelectron spectroscopy (XPS) full scan spectra were obtained by the methods suggested in the paper. These procedures can be used without the intervention of spectroscopy experts.

and can be applied in automated data systems.

Surface chemical analysis X-ray photoelectron spectroscopy full scan Spectroscopy provides near-real-time information on carbon-containing surface compounds Rules for identification and correction of contamination

1 Scope

This document describes methods for assisting the surface analysis of thin films of materials that do not contain carbon compounds as an expected component but that the C1s peak is observed in the full scan spectrum. These films can be grown on metals and alloys by oxygen or electrochemical oxidation, and can also be deposited on inert the procedure is not suitable for discontinuous deposition of particles on a substrate. In addition, a method is provided for A simple procedure for identifying C1s signals in contaminants. When a C1s peak is identified as coming from an extraneous overlying layer, the components derived from the full spectrum are the proposed procedures are provided in the form of simple rule structures in an "if-then" format, so that they the information contained can be used by automated programs in data systems. The provided rules only

use the information retrieved from the XPS full scan (spectrum).
information.

2 Normative references

This document has no normative references.

3 Terms and Definitions

The following terms and definitions apply to this document.

region

A portion of the fully accessible photoexcitation spectrum is selected for detailed acquisition (ie, a "narrow" scan).

NOTE: The region may be selected because it contains a major or minor peak for a particular element, or because it represents the shape or profile of the background in that energy range.

Full scan surveyscan A scan or series of scans is performed over a substantial portion of the spectrum of photoelectrons excited by a given X-ray source.

goal

The achievement of the goal is part of the graph parsing process.

NOTE For example, completion of a quantitative analysis could be considered achievement of an objective.

4 Symbols and abbreviations

The following symbols and abbreviations apply to this document.

- a. Maximum value (counts per second, cps) of the energy loss baseline linear region after the C1s peak at constant intensity.
- b. The point in the linear background selected as a reference when measuring the a value, and the position of the measured "a" value (eV) the interval is expected to be on the order of 30 eV.

Ccontamination. The atomic fraction of carbon in the contamination layer.