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Surface chemical analysis — X-ray photoelectron spectroscopy — Procedures for assessing the day-to-day performance of an X-ray photoelectron spectrometer

Analyse chimique des surfaces — Spectroscopie de photoélectrons X — Modes opératoires d'évaluation de la performance au jour le jour d'un spectromètre de photoélectrons X

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 201, *Surface chemical analysis*, Subcommittee SC 7, *Electron spectroscopies*.

This second edition cancels and replaces the first edition (ISO 16129:2012), which has been technically revised.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

XPS instruments are complex, and unsatisfactory performance is not always obvious to an operator. It is therefore necessary to provide a test for the correct operation of the system that can be performed regularly and frequently without interfering excessively with the normal work of the laboratory.

A full diagnostic test can require many hours or even days; such a test can be appropriate only when the instrument is known to have a fault that needs to be remedied or following a major maintenance procedure. Data acquired before a problem is uncovered become suspect if the spectrometer has not been routinely tested, leading to a loss of confidence in those data. If a regular check of the instrument is made, changes in performance can be monitored and corrective action taken in good time to ensure that the data supplied are fit for purpose. In the event that a serious fault is uncovered, then only the data since the last check can be in doubt and need to be repeated.

The purpose of this document is to provide users with a procedure which is not excessively time-consuming so that it can be completed on a regular and frequent basis – daily if required. The user will then gain an awareness of the current characteristics of the instrument so that a decision can be made as to whether or not a more complete and time-consuming action is required to return the instrument to a satisfactory level of performance.

This procedure is intended to be applied to an XPS instrument that has been correctly calibrated and aligned in accordance with ISO standards or manufacturer's instructions. It is designed to highlight aspects of the instrument's characteristics that differ significantly from those that were measured immediately following the calibration procedure. The procedure does not show how the instrument can be returned to its original state. Instead, it guides the user to possible areas of concern. The procedure provides data that can be used in control charts, allowing trends to be observed and acted upon before data quality deteriorates to an unacceptable level for the needs of the analyst.