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

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**Surface chemical analysis -- Auger electron spectroscopy --
Repeatability and constancy of intensity scale**

表面化学分析 俄歇电子能谱 强度标的重复性和一致性

(English Translation)

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Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules.

This standard uses the translation method identical with ISO 24236:2005 "Surface chemical analysis - Auger electron spectroscopy and repeatability of intensity scale consistency".

The standard micro-beam analysis by the National Standardization Technical Committee (SAC/TC38) and focal points.

Introduction

The material is widely used in surface analysis by Auger electron spectroscopy (AES). Elements in the sample (except hydrogen and helium) can be measured by comparing Outgoing Auger electron kinetic energy corresponding to the value of the different elements of the manual to identify the table values. For information about the content of these elements can be measured from the Auger electron intensity was obtained. The formula to calculate the content available and relative sensitivity factors provided by the spectrometer manufacturer to carry out. weight to the sensitivity factors to be applied to the spectrometer, and this is precisely when the general spectrometer installed or by the appropriate body strength equipment/energy the response of function after calibration. This standard focuses on two aspects of the Auger electron spectroscopy instrument intensity measurement uncertainty important contribution.

2) intensity over time drift; 1) strength measurement repeatability.

Repeatability analysis of the differences and similarities between similar samples is important. Instrument limit measurement repeatability factors include. electron-beam source the stability of the detector sensitivity settings, the instrument is placed on the sample, the data acquisition parameters and data processing steps. The strength of the underlying instrument drift the accuracy of the overall shift will limit any quantitative analysis, it is the source. EDS structural components, electronics accessories and detector aging equivalent should. It has been found, Auger electron spectroscopy During use, the strength of the

instrument/energy response function can change over the life of the instrument.

This standard describes the strength of the underlying instrument to determine the repeatability and consistency of a simple way in order to make the following correction, such as improved Operating procedures, reset or recalibrate the instrument parameters intensity/energy response function. Therefore, this method should be regularly implemented, and the manufacturer the most useful cycle or other appropriate institutions for verification of instrument work properly. The method uses a copper (Cu) sample, and an electron gun beam suitable for can at least 2keV Auger electron spectroscopy.

Since the required test can be very time consuming and requires expert knowledge and auxiliary equipment, so this method is not possible to cover all the instruments missing trap. However, this conventional method is to solve the basic problem of Auger electron spectroscopy repeatability and drift intensity scale and design. This Method with the use of ISO 17973 [1] or ISO 17974 [2] spectrometer energy calibration performed simultaneously.

Surface chemical analysis - Auger electron spectroscopy Repeatability and consistency of intensity scale

1 Scope

Energy electron gun for use in routine analysis of at least 2keV Auger electron spectroscopy, this standard provides an assessment of its strong Repeatability and constancy of the subject methods. It applies only to a sputter ion gun cleaning equipment. This standard is not intended to become a Species intensity/energy response calibration functions such calibration by equipment manufacturers or other bodies to develop. The method provides data to assess and determine Recognized instrument intensity/energy response function to maintain a constant accuracy, this can affect the constancy of some instrument settings given guidance.

2 Symbol

By HL differential mode CuL3VV average peak peak - peak height HLj a set of measurements in the measurement of the value of the j HL contribution Under HM differential mode CuM2,3VV average peak peak - peak height H Mj a set of measurements in the j-th value measurement of HM contribution i Pi, one of the five parameters identifier Mark j parameters Pij one single measurement CuL3VV peak located directly under the NL average maximum intensity mode NLj a set of measurements in the measurement of the value of j-th contribution NL CuM2,3VV position of the peak at an average maximum intensity NM Direct Mode NMj a set of measurements in the measurement of the value of j-th contribution NM Pi represents the parameter HL, HM, NL, NM and HL/HM any one of the average Pij having the j-th average value of Pi measured parameter Uncertainty of average value of Pi U95 P () i confidence level of 95% W peak FWHM beta analog system

scan rate delta confidence level of 95% (set by analysts) when HL/HM tolerance limits
 sigmaP () parameter Pi repeatability standard deviation the time constant tau analog
 detection system

3 Method Summary

This summary is intended to facilitate the detailed steps presented in Chapter 4 understanding. This step is evaluated by Auger electron spectroscopy, and need to get registration Preparation of reference foil, and electronics to measure CuM2,3VV Auger peak intensity CuL3VV where appropriate instrument settings. We chose these Peak is low because of their proximity kinetic analysis of the actual end use. They have been recognized, and corresponding reference data. Choose low CuM2,3VV peak energy, which is due to its energy range can be used to monitor stray fields undesirable change in strength.

4.1 to 4.5 describes the initial steps of sample preparation and instrument settings, as shown in the flowchart in Figure 1, the figure in the corresponding sub-headings paraphrase.

If you do not do strength repeatable measurements should be 4.6 to 4.7 feed. In 4.7, the order of repeated measurements and 7 times CuM2,3VV CuL3VV peak intensity. These data give the peak intensity repeatability standard deviation, both from the electron beam intensity, energy spectrometer detectors and electronics attached