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

GB/T 21006-2007

**Surface chemical analysis -- X-ray photoelectron and Auger
electron spectrometers -- Linearity of intensity scale**

表面化学分析 X射线光电子能谱仪和俄歇电子能谱仪 强度标的线性

(English Translation)

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Foreword

This standard is identical with ISO 21270:2004 "Surface chemical analysis - X-ray photoelectron spectroscopy and Auger electron spectroscopy strength Linear subject "(in English).

This standard is equivalent to translate ISO 21270:2004. For ease of use, this standard made the following editorial changes.

--- Use the decimal symbol instead of decimal symbol " , " . " , " ;

--- Use the "standard" instead of "this International Standard." Appendix A of this standard is an informative annex.

This standard by the National Standardization Technical Committee microbeam and focal points.

This standard was drafted. Institute of Chemistry, China Institute of Metrology.

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Introduction

When using Auger electron spectroscopy (AES) or X-ray photoelectron spectroscopy (XPS) analysis of the material surface to be measured quantitatively strong line degree. Unless

corrected, the strength of the underlying instrument will directly lead to the presence of non-linear error of the measurement results. Typically, the intensity scale at very low count when the rate is linear, but increases the count rate will gradually become non-linear. Measuring the signal strength depends on the strength of the measurement system, the output of Signal is set proportional to the measured intensity. In the counting system, it is desirable for this ratio is 1. If the ratio of the signal strength or count rate and Change, the measuring system is considered to be non-linear. Nonlinear less than 1% is generally considered not serious. When the count exceeds the maximum allowable Count rate of 5%, the strength of the underlying non-linear may exceed 1% [1,2]. For many instruments, as long as the correct settings Detection System, a non-linear Nature will not change significantly in the next few months. The above apparatus, the count rate can be corrected with the corresponding relationship, so that the strength of the corrected it is linear larger maximum allowable count rate. This standard describes two simple relationship for correction, which involves a A parameter detection system known as dead time. Nonlinear some instruments can not be used a simple formula to predict or describe the relationship. These instruments, this Criteria can be used to measure the degree of nonlinearity and determine the maximum count rate acceptable limits under linear discrete. This limit can be used for linear discrete According to the analysis requirements of the user appropriately selected.

This standard provides two linear measuring methods. The principle is a method of the output signal is proportional to the AES spectrometer in the electron beam or XPS X-ray beam flux [1]. This is the easiest way, can be operated on the following instruments, these instruments beam or flux it can be set to 30 or more approximately equally spaced, using a beam or flux until the maximum count rate of the standard required. But for Some X-ray flux can set two or less than the predetermined value 30 the XPS spectrometer, a method can not be used, the method requires two [2].

When the identification of a new spectrometer, the need to work in order to make spectrometer count rates in the appropriate scope of this standard. In the following cases You need to use the standard calibration. 1) After the detection circuit to make any substantive adjustment; 2) (the use of this standard since the last examination) multiplier Voltage has increased after vendors increments of 1/3; 3) After replacing the electron multiplier; 4) spaced approximately 12 months later.

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1 Scope

This standard specifies two methods for the determination of AES and XPS spectrometer intensity scale maximum count within an allowable range of linear discrete limit Data rate. It also includes a correction strength of the non-linear method so that the spectrometer can

use a higher maximum count rate for spectrometers related Correction formula has been proven to be effective.

2 Normative references

The following documents contain provisions which, through reference in this standard and become the standard terms. For dated references, subsequent Amendments (not including errata content) or revisions do not apply to this standard, however, encourage the parties to the agreement are based on research Whether the latest versions of these documents. For undated reference documents, the latest versions apply to this standard.

ISO 18115 Surface chemical analysis - Vocabulary

3 Symbol

CuL3VV peak E_{Cu} --- measured energy value;

Energy value E_j --- jth energy channels;

--- K constant;

MH (E_j) --- high-intensity X-ray spectrum in the correction count rate at the energy E_j;

NH (E_j) --- high-intensity X-ray spectra measured count rates at the energy E_j;

NL (E_j) --- low intensity X-ray spectra measured count rates at the energy E_j;

N_{max} --- the system and that the system remains within the k (1 ± delta) given tolerance limit range of linear discrete maximum count rate;

± delta --- linear limit fraction;

tau_e --- extend the dead time;

tau_n --- non-extended dead time.

4 Summary

Linear two methods available instruments assess strength. First, the process of this standard provides a general method, which applies to the AES instrument and X-ray flux may have 30 or more equally spaced and known incremental XPS spectrometer. This method is called to change the source flux method. For X Ray flux only two or more but less than 30 settings XPS spectrometer, a method is not applicable; This standard provides a second method, the method is called Do spectral ratio method.

In a method, the spectrometer must be equipped with an inert gas ion sputtering gun for cleaning the sample. Intensity scale linear measurement sputtering cleaned the copper samples. The second method is also available sample; if not equipped with an ion gun, you

can use stainless steel sample or sample holder. 6.1 description He said the selection of the sample, 6.2 and 6.3 describes the preparatory steps of the sample. 6.4 describes the selection spectrometer settings 6.5 Description of the instrument Operation.

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