ISO 10810:2019 (E)

Surface chemical analysis — X-ray photoelectron spectroscopy — Guidelines for analysis

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 Symbols and abbreviations

5 Overview of sample analysis

6 Specimen characterization

6.1 General
6.2 Specimen forms
6.2.1 General
6.2.2 Single crystal
6.2.3 Adsorbed or segregated layers, films and residues
6.2.4 Interfaces and multilayered samples
6.2.5 Non-porous
6.2.6 Porous
6.2.7 Powder
6.2.8 Fibres and textiles
6.2.9 Internal interface
6.3 Material types
6.3.1 General
6.3.2 Metals and alloys
6.3.3 Polymers
6.3.4 Semiconductors
6.3.5 Magnetic materials
6.3.6 Ceramics
6.3.7 Catalysts
6.3.8 Glass and insulators
6.3.9 Biological
6.3.10 Nanoparticles
6.4 Handling and mounting of specimens
6.5 Specimen treatments
6.5.1 General
6.5.2 Heating and cooling
6.5.3 Scraping and fracture
6.5.4 Ion bombardment for analysing thin films
6.5.5 Exposure to gases and liquids

7 Instrument characterization[8]

7.1 General
7.2 Instrument checks
7.2.1 System health check[9]
7.2.2 Mechanical
7.2.3 Sample holder
7.2.4 Vacuum
7.3 Instrument calibration

7.3.1 Calibration of binding energy scale
7.3.2 Intensity repeatability and intensity/energy response function (IERF)
7.3.3 Linearity of intensity scale test
7.3.4 Lateral resolution
7.3.5 Depth resolution[21][22]
7.3.6 Charge correction
7.4 Instrument set-up
7.4.1 Optimum settings
7.4.2 System configuration

8 The wide-scan spectrum

8.1 Data acquisition
8.1.1 General
8.1.2 Sample loading
8.1.3 Energy resolution
8.1.4 Energy range, step size and acquisition mode
8.1.5 X-ray source and conditions
8.1.6 Charge correction
8.1.7 Spectrum acquisition
8.1.8 X-ray degradation
8.1.9 Thin surface layer
8.2 Data analysis
8.2.1 Calibration of the binding energy scale
8.2.2 Peak table
8.2.3 Quantification
8.2.4 Assessment of the composition employing the Tougaard extrinsic background[42]
8.2.5 Requirement for narrow scans

9 The narrow scan

9.1 General
9.2 Data acquisition
9.2.1 Instrument settings
9.2.2 Choice of region
9.3 Data analysis
9.3.1 Element identification
9.3.2 Chemical-state identification
9.3.2.1 Methods of identifying chemical state[48]
9.3.2.2 Assessment of compositional inhomogeneities in the sample[38]
9.3.2.3 Estimation and assessment of trial sample composition
9.3.2.4 Consideration of possibility of multiple compounds in sample
9.3.3 Quantification
9.3.3.1 Measurement of peak intensities[38]
9.3.3.2 Measurement of composition for an identified phase (homogeneous sample)
9.3.3.3 Measurement of composition as a function of depth
9.3.3.3.1 General
9.3.3.3.2 Non-destructive
9.3.3.3.3 Destructive
9.3.3.4 Measurement of overlayer-film thickness
9.3.3.5 Measurement of composition as a function of lateral position on the sample

10 Test report

Page count: 32