ISO/TS 18507:2015-07 (E)

Surface chemical analysis - Use of Total Reflection X-ray Fluorescence spectroscopy in biological and environmental analysis

Contents

Page

Foreword v

Introduction vi

1 Scope 1

2 Normative references 1

3 Terms, definitions, symbols, and abbreviated terms 1
3.1 Terms and definitions 1
3.2 Symbols and abbreviated terms 2

4 Background 2
4.1 Preliminary remarks 2

5 Instrumentation 4
5.1 Instrumental requirements 4
5.1.1 X-ray sources of radiation 4
5.1.2 Monochromator 5
5.1.3 Detector 5
5.1.4 Sample station 6
5.1.5 Critical and glancing angle 6
5.2 Quality control of TXRF spectrometer 7
5.2.1 Stability check of X-ray beam 7
5.2.2 Spectroscopic resolution 7
5.2.3 Energy calibration 8
5.2.4 Sensitivity test 8

6 Specimen preparation 8
6.1 Preliminary remarks 8
6.2 Sample carriers 9
6.2.1 Choice of sample carriers 9
6.2.2 Cleaning procedure for sample carriers 9
6.3 Sample treatment procedures for chemical analysis by TXRF 10
6.3.1 Liquid samples 10
6.3.2 Solid samples 12
6.3.3 Preparation of the Internal Standard solution 13

7 Data Collection and Storage 14
7.1 Preliminary remarks 14
7.2 Data collection 14

8 Data Analysis 14
8.1 Qualitative analysis 14
8.2 Quantitative analysis 14
8.2.1 Preliminary remarks 14
8.2.2 Background correction 14
8.2.3 X-ray intensities of each element 15
8.2.4 Experimental derivation of relative sensitivities 15
8.2.5 Quantification by means of internal standard 15
8.2.6 Statistical treatment 16

9 Information required when reporting TXRF analysis 16
9.1 Preliminary remarks 16
9.2 Experimental details 16
9.3 Analysis procedures 17

Annex A (informative) Comparison of detection limits of TXRF, AAS, and ICP-MS 18

Annex B (informative) Case studies of TXRF analysis for environmental applications 21

Annex C (informative) Case studies of TXRF analysis for biological applications 24

Annex D (informative) Theoretical derivation of relative sensitivity factors 27

Bibliography 29