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Nota di contenuto	A Practical Approach to Quantitative Metal Analysis of Organic Matrices; Contents; Preface; Biography; Acknowledgements; 1 A Practical Approach to Quantitative Metal Analysis of Organic Matrices Using ICP- OES; 1.1 Introduction and Basic Overview; 1.2 Schematic Representation of the Energies Generated by Atomic Spectroscopic Methods; 1.3 Excitation Energy (Quantum Theory and Atomic Spectra); 1.4 Ionisation Energy and Number of Excited Atoms; 1.5 Width of Atomic Lines; 1.5.1 Natural Broadening; 1.5.2 Doppler Broadening; 1.5.3 Lorentzian Broadening or Pressure Broadening 1.5.4 Holtsmark Broadening or Resonance Broadening1.5.5 Field Broadening or Stark Broadening; 1.5.6 Self-Absorption and Self- Reversal Broadening; 1.6 Brief Summary of Atomic Spectroscopic Techniques Used for Elemental Analysis; 1.6.1 The Atomic Absorption Spectrophotometer; 1.6.2 Atomic Fluorescence Spectroscopy; 1.6.3 Direct Current Plasma Optical Emission Spectrometry (DCP-OES); 1.6.4 Microwave Induced Plasma (MIP); 1.6.5 Glow Discharge Optical

Emission Spectrometry (GD-OES); 1.6.6 Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES)

1.7 Summary: Applications of Atomic SpectroscopyReferences; 2 Instrumentations Associated with Atomic Spectroscopy; 2.1 Instrumentation; 2.2 Types of Plasma Sources; 2.2.1 Direct Current Plasma Atomic Emission Spectrograph; 2.2.2 Microwave Induced Plasma; 2.2.3 Optical Emission Spectroscopy; 2.3 Sample Introduction Systems; 2.3.1 Mechanical Transfer of Sample/Standards Using Peristaltic Pump, Pressure Valves, Motorised Syringes, etc.; 2.3.2 Nebulisers; 2.3.3 Brief Outline of Atomic Spectroscopy Hyphenated Systems; 2.4 Spray Chambers; 2.5 ICP-OES Torches; 2.6 Optics; 2.6.1 Grating Orders

2.7 Signal Detectors2.7.1 Photomultiplier Tubes; 2.7.2 Charge Coupled Devices; References; 3 Methodologies of Metal Analysis of Organic Matrices Using ICP-OES; 3.1 Sample Preparation Techniques and Methods of Analysis; 3.2 Defining Goals; 3.3 Steps in Chemical Analytical Protocol; 3.4 Sampling and its Importance; 3.5 Sample Preparation Methods; 3.5.1 Direct Analysis of Organic Solutions; 3.5.2 Sample Dissolution; 3.5.3 Chemical Extraction of Metals from Organic Matrices; 3.5.4 Dry Ashing without Retaining Aids; 3.5.5 Dry Ashing with Retaining Aids; 3.5.6 Acid Digestion Using Microwave Oven 3.5.7 Oxygen Bomb Flask Combustion (Low Pressure)3.5.8 High Pressure Oxygen Combustion; 3.5.9 Sample Preparation Using Fusion Methods; 3.5.10 Analysis Using Slurry Solution Method; 3.5.11 Sample Preparation Using Leaching Method; 3.5.12 Sample Preparation Using a UV Digester; 3.6 Non-Spectral Corrections Using ICP-OES; 3.6.1 Effect of Solvents on ICP-OES; 3.6.2 Effect of Viscosity on Signal Response; 3.6.3 Comparison of Nebulisation Efficiency of Solvents Using ICP-OES; 3.6.4 Choice of Carrier Liquid; 3.7 Methodology of Measurement; 3.7.1 Choice of Standard Materials

3.7.2 Quantitative Analysis Using Calibration Graph Method

Sommario/riassunto

There has been significant expansion in the application of atomic spectrographic techniques in recent years, which has brought with it the need to provide more flexible methods to a wider range of samples, particularly non-aqueous samples. This book compares the traditional and improved methods in the analysis of non-aqueous samples for elemental analyses by atomic emission spectroscopic methods whilst describing procedures that will attempt to improve sample preparation methods.