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Nota di contenuto	1. X-ray Fluorescence Spectroscopy: Introduction, Latest Developments and Applications -- 2. Recent Developments in WDXRF and EDXRF: Instrumentation, Analytical Performance, and Emerging Applications -- 3. X-ray Detectors and Associated Imaging Applications: Emerging Trends and Challenges -- 4. Synchrotron X-ray Fluorescence Imaging and Recent Developments -- 5. Recent Developments in Total Reflection X-ray Fluorescence and Applications -- 6. Data Analysis and Chemometrics in X-ray Fluorescence and Applications -- 7. Data Analysis and X-ray Fluorescence in Environmental Toxicology -- 8. Benchtop Micro X-ray Fluorescence (-XRF) for Plant Analysis -- 9. X-

ray Fluorescence Analysis of Vegetation Tissues via Chemometric Tools -- 10. X-ray Fluorescence in Analyzing Agricultural Contamination via Chemometric Tools -- 11. X-ray Fluorescence Spectroscopy for Analyzing Food Products Coupled with Chemometrics -- 12. X-ray Fluorescence for Geological Samples Combined with Chemometrics -- 13. Total Reflection X-ray Fluorescence: Technological Developments and Expanding Applications -- 14. X-ray Fluorescence Detection of Fluorine, Chromium, Arsenic, Cadmium, Mercury, Lead and Uranium Measuring Drinking Water Toxicity -- 15. Different XRF Methods for Detection of Chemical Hazards in Drinking Water -- 16. X-ray Fluorescence Analysis of Atmospheric Particulate Matters -- 17. Wavelength Dispersive X-ray Fluorescence Spectroscopy for Diagnosis of Nematode Infested Plants.

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## Sommario/riassunto

This book delves into X-ray fluorescence (XRF) spectroscopy, focusing on instrumental developments and data analysis methods employing chemometrics for environmental applications. The integration of information from multiple datasets is gaining an increase in attention and significance in the environmental sciences. In this book, the contributors provide an up-to-date treatment of the most extensively used chemometric methods for predicting and interpreting spectroscopic data in environmental applications. This book describes recent trends in XRF spectroscopic methods, encompassing energy-dispersive and wavelength-dispersive X-ray fluorescence, synchrotron radiation-based XRF, micro-XRF, and total reflection-XRF. It delivers a comprehensive discussion on X-ray detectors and associated imaging applications, along with an exploration of the analytical capabilities of these methods, including detection limits, accuracy, and precision in measurements for environmental samples. Furthermore, this book discusses the numerous advantages and limitations of these techniques, highlighting the latest developments in algorithms based on machine learning, neural networks, and AI for spectroscopic data interpretation. This book caters to researchers across various branches of science and technology, aiming to introduce them to modern techniques coupled with advanced data analysis methods. It serves as a valuable reference for those engaged in XRF spectroscopy techniques, hyphenated XRF spectroscopic techniques, and the characterization of biomolecular systems and environmental samples.

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