

1. Record Nr.	UNINA9910830012903321
Titolo	Spectrochemical analysis using infrared multichannel detectors [[electronic resource] /] / edited by Rohit Bhargava and Ira Levin
Pubbl/distr/stampa	Ames, Iowa, : Blackwell Pub., c2005
ISBN	1-281-32014-5 9786611320140 0-470-98854-1 0-470-99412-6
Descrizione fisica	1 online resource (326 p.)
Collana	Sheffield Analytical Chemistry Series
Altri autori (Persone)	BhargavaRohit <1974-> LevinIra <1935->
Disciplina	535.842
Soggetti	Infrared spectroscopy Infrared imaging Spectrum analysis
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Spectrochemical Analysis using Infrared Multichannel Detectors; Contents; Contributors; Preface; 1 Fourier transform mid-infrared spectroscopic imaging; 1.1 Introduction; 1.2 Fundamentals of FTIR spectroscopy; 1.2.1 Interferometer characteristics; 1.3 FTIR microspectroscopy using a single-element detector; 1.3.1 IR microscopes and point spectroscopy; 1.3.2 FTIR mapping; 1.3.3 Limitations of FTIR point mapping; 1.4 FTIR imaging with multichannel detectors; 1.4.1 Imaging with large format array detectors; 1.4.2 Interfacing an interferometer to large array detectors 1.4.3 The SNR of imaging spectrometers 1.4.4 The evolving detector array technology; 1.5 Raster scanning with linear array detectors; 1.5.1 Choice of either small or large detector arrays; 1.6 Conclusions; References; 2 Near-infrared spectral imaging with focal plane array detectors; 2.1 Background: single-point near-infrared spectroscopy; 2.2 Development of NIR spectral imaging; 2.2.1 History of spectral imaging; 2.2.2 FPAs - specifications; 2.2.3 Implementation of NIR imaging; 2.2.4 Data processing; 2.2.5 Comparison of vibrational

spectroscopic imaging modalities; 2.2.6 Safety in numbers
2.3 Examples of NIR spectral imaging capabilities 2.3.1 Sample statistics and FOV; 2.3.2 High-throughput applications; 2.3.3 Statistics, morphology, abundance - using an internal reference; 2.4 Conclusions; References; 3 Multichannel detection with a synchrotron light source: design and potential; 3.1 Introduction; 3.2 Comparisons of thermal and SR sources; 3.2.1 Blackbody radiation; 3.2.2 SR as an IR source; 3.3 The IR microspectrometer: instrumentation and optical analysis; 3.3.1 Microspectrometer system components; 3.3.2 Performance: imaging at the diffraction limit
3.3.3 The FPA microscope system 3.4 Combining SR with an FPA microspectrometer; 3.4.1 FPA microspectrometer for PSF image deconvolution; 3.4.2 SR as an extended IR source; 3.5 Summary; Acknowledgements; References; 4 Multivariate analysis of infrared spectroscopic image data; 4.1 Introduction; 4.2 Preprocessing hyperspectral images; 4.2.1 Data compression; 4.2.2 Smoothing spectra; 4.2.3 Noise in hyperspectral images; 4.3 Processing hyperspectral images; 4.3.1 Feature extraction; 4.3.2 Concentration image maps; 4.4 Conclusions; References; 5 FTIR imaging of multicomponent polymers
5.1 Introduction 5.2 Imaging requirements for polymer characterization; 5.3 Polymer sampling for FTIR imaging; 5.3.1 Transmission measurements; 5.3.2 Reflection FTIR imaging measurements; 5.3.3 ATR FTIR imaging; 5.4 FTIR image analysis; 5.4.1 Selection of characteristic spectral stains for each component; 5.4.2 Construction of contour plots; 5.4.3 Histograms; 5.5 Applications of FTIR imaging to complex polymer systems; 5.5.1 FTIR imaging of polymer laminate films; 5.5.2 Chemical morphology of multi-component polymeric materials; 5.5.3 Immiscible polymer blends
5.5.4 Crosslinking-induced phase separation of elastomers

Sommario/riassunto

This book provides a state-of-the-art review of a major recent technology which has now reached a level of maturity. The editors have pioneered the development and application of these techniques and technologies, and the chapter authors are leading practitioners in their subject areas. The volume encompasses methods and instrumentation across a range of applications. It is directed at researchers and professionals in vibrational spectroscopy, analytical chemistry, materials science, biomedicine, food science and combinatorial chemistry.
