

CONTENTS

I. HIGH BRILLIANCE SOURCES/APPLICATIONS

Synchrotron Radiation X-Ray Fluorescence Analysis	1
J. V. Gilfrich	
X-Ray Diffraction Using Synchrotron Radiation - A Catalysis Perspective	9
J. M. Newsam, H. E. King, Jr., and K. S. Liang	

II. ON-LINE X-RAY ANALYSIS

On-Line X-Ray Fluorescence Spectrometer for Coating Thickness Measurements	21
N. Matsuura and T. Arai	
Process Control Applications of the Peltier Cooled Si(Li) Detector Based EDXRF Spectrometer	31
A. R. Harding	
Application of Fundamental Parameter Software to On-Line XRF Analysis	39
D. J. Leland, D. E. Leyden and A. R. Harding	
On-Stream XRF Measuring System for Ore Slurry Analysis	45
B. Holynska, M. Lankosz, J. Ostachowicz, T. Wesolowski and J. Zalewski	
Applications of On-Line XRF and XRD Analysis Techniques to Industrial Process Control	49
M. Hietala and D. J. Kalnicky	
On-Site Tests of a New XRD/XRF On-Line Process Analyzer	59
A. Ahonen, C. V. Alftan, M. Hirvonen, J. Ollikainen, M. Rintamäki, K. Saloheimo and P. Virtanen	

III. XRF MATHEMATICAL MODELS AND QUANTITATION

Concepts of Influence Coefficients in XRF Analysis and Calibration	69
R. M. Rousseau	
Painless XRF Analysis Using New Generation Computer Programs	77
R. M. Rousseau	

Intensity and Distribution of Background X-Rays in a Wavelength-Dispersive Spectrometer. II. Applications	83
K. Omote and T. Arai	
What Can Data Analysis do for X-Ray Microfluorescence Analysis?	89
J. D. Zahrt	
The Determination of Rare Earth Elements in Geological Samples by XRF Using the Proportional Factor Method	97
C. Yuanpan	

IV. TECHNIQUES AND XRF INSTRUMENTATION

How to Use the Features of Total Reflection of X-rays for Energy Dispersive XRF	105
H. Schwenke, W. Berneike, J. Knuth and U. Weisbrod	
Applications of a Laboratory X-Ray Microprobe to Materials Analysis . .	115
D. A. Carpenter, M. A. Taylor and C. E. Holcombe	
Development of Instrument Control Software for the SRS/300 Spectrometer on a VAX/730 Computer Running the VMS Operating System	121
M. J. Rokosz and B. E. Artz	
Instrumentation and Applications for Total Reflection X-Ray Fluorescence Spectrometry	131
Y. Tada, Y. Sako, K. Iwamoto, S. Gonsui and T. Arai	
Micro X-Ray Fluorescence Analysis with Synchrotron Radiation	141
S. Hayakawa, A. Iida, S. Aoki and Y. Gohshi	
X-Ray Microprobe Studies Using Multilayer Focussing Optics	149
A. C. Thompson, J. H. Underwood, Y. Wu, R. D. Giauque, M. L. Rivers and R. Futernick	

V. XRF APPLICATIONS

Resolution Enhancement for Cu K-alpha Emission of Y-Ba-Cu-O Compounds	155
N. Saitoh, Y. Higashi, M. Minami, S. Fukushima, Y. Gohshi, S. Kohiki and T. Wada	
Chemical State Analysis by X-Ray Fluorescence Using Absorption Edges Shifts	167
K. Sakurai, A. Iida and Y. Gohshi	
High Resolution X-Ray Fluorescence Si K β Spectra: A Possible New Method for the Determination of Free Silica in Airborne Dusts	177
J. Purton, D. S. Urch and N. G. West	
Quantitative Analysis of Fluorine and Oxygen by X-Ray Fluorescence Spectrometry Using a Layered Structure Analyzer	185
M. Takemura and H. Ohmori	

The Homogeneity of Fe, Sr and Zr in SL-3/Lake Sediment Standard Reference Material by Radioisotope Induced X-Ray Emission	191
J. J. LaBrecque and P. A. Rosales	
Quantitative Analysis of Arsenic Element in a Trace of Water Using Total Reflection X-Ray Fluorescence Spectrometry	197
T. Ninomiya, S. Nomura, K. Taniguchi and S. Ikeda	
Impurity Analysis of Silicon Wafers by Total Reflection X-Ray Fluorescence Analysis	205
S. Nomura, K. Nishihagi and K. Taniguchi	
Sample Treatment for TXRF - Requirements and Prospects	211
A. Prange and H. Schwenke	
Sample Preparation Optimization for EDXRF Analysis of Portland Cement	221
W. Watson, J. Parker and A. R. Harding	
The Viability of XRF Determination of Gold in Mineral Reconnaissance .	227
T. K. Smith and M. N. Ingham	
An Improved Fusion Technique for Major-Element Rock Analysis by XRF .	233
R. A. Couture	
Modern Alloy Analysis and Identification with a Portable X-Ray Analyzer	239
S. Piorek	
Low Level Iodine Detection by TXRF Spectrometry	251
F. Hegedüs and P. Winkler	
The Application of P-32 and Sn-113 Radionuclides for the Determination of Noble Metals	255
J. J. LaBrecque and P. A. Rosales	
Characterization of Permalloy Thin Films via Variable Sample Exit Angle Ultrasoft X-Ray Fluorescence Spectrometry	261
G. Andermann, F. Fujiwara, T. C. Huang, J. K. Howard and N. Staud	

VI. ANALYSIS OF THIN FILMS BY XRD AND XRF

X-Ray Diffraction Analysis of High Tc Superconducting Thin Films	269
T. C. Huang, A. Segmüller, W. L. Lee, D. C. Bullock and R. Karimi	
Thickness Measurement of Epitaxical Thin Films by X-Ray Diffraction Method	279
J. Chaudhuri, S. Shah and J. P. Harbison	
Texture Analysis of Thin Films and Surface Layers by Low Incidence Angle X-Ray Diffraction	285
J. J. Heizmann, A. Vadon, D. Schlatter and J. Bessières	
Fast Thickness Measurement of Thin Crystalline Layers by Relative Intensities in XRPD Method	293
G. Kimmel, G. Shafirstein and M. Bamberger	

X-Ray Diffraction of Thin Oxide Films on Soldered Module Pins	303
T. P. Adl and H. F. Stehmeyer	
X-Ray Diffraction Studies of Polycrystalline Thin Films Using Glancing Angle Diffractometry	311
R. A. Larsen, T. F. McNulty, R. P. Goehner and K. R. Crystal	
Density Measurement of Thin Sputtered Carbon Films	323
G. L. Gorman, M.-M. Chen, G. Castillo and R. C. C. Perera	
Determination of Ultra-Thin Carbon Coating Thickness by X-Ray Fluorescence Technique	331
R. L. White and T. C. Huang	

VII. X-RAY STRESS ANALYSIS

Separation of the Macro- and Micro-Stresses in Plastically Deformed 1080 Steel	341
R. A. Winholtz and J. B. Cohen	
Effect of Plastic Deformation on Oscillations in "d" vs. $\sin^2\psi$ Plots A FEM Analysis	355
I. C. Noyan and L. T. Nguyen	
X-Ray Diffractometric Determination of Lattice Misfit Between γ and γ' Phases in Ni-Base Superalloys - Conventional X-Ray Source vs. Synchrotron Radiation	365
K. Ohno, H. Harada, T. Yamagata, M. Yamazaki and K. Ohsumi	
Standard Deviations in X-Ray Stress and Elastic Constants Due to Counting Statistics	377
M. Kurita	
Elastic Constants of Alloys Measured with Neutron Diffraction	389
B. D. Butler, B. C. Murray, D. G. Reichel and A. D. Krawitz	
Stress Measurements with a Two-Dimensional Real-Time System	397
G. M. Borgonovi and C. P. Gazzara	
Application of a New Solid State X-Ray Camera to Stress Measurement	407
M. A. Korhonen, V. K. Lindroos and L. S. Suominen	
Advantages of the Vector Method to Study the Texture of Well-Textured Thin Layers	415
A. Vadon and J.-J. Heizmann	
Taking into Account the Texture Effect in the Measurement of Residual Stresses by Using the Vector Method of Texture Analysis	423
A. Tidu, A. Vadon and J.-J. Heizmann	
X-Ray Diffraction Studies on Shock-Modified Y Ba ₂ Cu ₃ O ₇ Superconductors	429
L. E. Lowry, D. D. Lawson, W. M. Phillips	
The Characterization of a Solid Sorbent with Crystallite Size and Strain Data from X-Ray Diffraction Line Broadening	437
F. E. Briden and D. F. Natschke	

X-Ray Measurement of Grinding Residual Stress in Alumina Ceramics	443
H. Yoshida, Y. Nanayama, Y. Morimoto, Y. Hirose, and K. Tanaka	
Residual Stresses Near SCC Fracture Surfaces of AISI 4340 Steel	451
Z. Yajima, M. Tsuda, Y. Hirose and K. Tanaka	
Residual Stress Measurement of Silicon Nitride and Silicon Carbide by X-Ray Diffraction Using Gaussian Curve Method	459
M. Kurita, I. Ihara and N. Ono	
Residual Stresses in $\text{Al}_2\text{O}_3/\text{SiC}$ (Whisker) Composites Containing Interfacial Carbon Films	471
A. Abuhasan and P. K. Predecki	

VIII. APPLICATIONS OF DIGITIZED XRD PATTERNS

Parallel Beam and Focusing Powder Diffractometry	481
W. Parrish and M. Hart	
Chemical Constraints in Quantitative X-Ray Powder Diffraction for Mineral Analysis of the Sand/Silt Fractions of Sedimentary Rocks	489
D. K. Smith, G. G. Johnson, Jr., M. J. Kelton and C. A. Andersen	
The Crystal Structures of the Cubic and Tetragonal Phases of $\text{Y}_1\text{Ba}_3\text{Cu}_2\text{O}_{6.5 + \delta}$	497
M. A. Rodriguez, J. J. Simmins, P. H. McCluskey, R. S. Zhou, and R. L. Snyder	
Using X-Ray Powder Diffraction to Determine the Structure of VPI-5 - A Molecular Sieve with the Largest Known Pores	507
C. E. Crowder, J. M. Garces and M. E. Davis	
Optimizing the Calculation of Standardless Quantitative Analysis	515
L. Jinsheng, X. Ronghou, T. Xiaoqun and C. Nieuwenhuizen	
Shadow: A System for X-Ray Powder Diffraction Pattern Analysis	523
S. A. Howard	

IX. QUALITATIVE AND QUANTITATIVE PHASE ANALYSIS DIFFRACTION APPLICATIONS

Specific Data Handling Techniques and New Enhancements in a Search/Match Program	531
P. Caussin, J. Nusinovici and D. W. Beard	
Use of the Crystal Data File on CD-ROM	539
M. Holomany and R. Jenkins	
A Reference Database Retrieval System: Information as a Tool to Assist in XRD Phase Identification	545
S. O. Alam, J. W. Edmonds, T. Hom, J. A. Nicolosi and B. Scott	
On the Selection of the Value for the Experimental Wavelength in Powder Diffraction Measurements	551
R. Jenkins	

Results of the JCPDS-ICDD Intensity Round Robin	557
W. N. Schreiner and R. Jenkins	
On the Preparation of Good Quality X-Ray Powder Patterns	561
D. B. Sullenger, J. S. Cantrell, T. A. Beiter and D. W. Tomlin	
Semi-Quantitative XRD Analysis of Fly Ash Using Rutile as an Internal Standard	569
A. Thedchanamoorthy and G. J. McCarthy	
Mechanically-Induced Phase Transformations in Plutonium Alloys	577
P. L. Wallace, W. L. Wien and R. P. Goehner	
The Determination of α -Cristobalite in Airborne Dust by X-Ray Diffraction - Theory and Practice	585
M. Jeyaratnam and N. G. West	
Automatic Computer Measurement of Selected Area Electron Diffraction Patterns from Asbestos Minerals	593
J. C. Russ, T. Taguchi, P. M. Peters, E. Chatfield, J. C. Russ, and W. D. Stewart	
Comparison of Experimental Techniques to Improve Peak to Background Ratios in X-Ray Powder Diffractometry	601
W. K. Istone, J. C. Russ and W. D. Stewart	
X-Ray Diffraction Studies of Solid Solutions of Pentaglycerine- Neopentylglycol	609
D. Chandra, C. S. Barrett and D. K. Benson	
Simultaneous Thermal and Structural Measurements of Oriented Polymers by DSC/XRD Using an Area Detector	617
S. T. Correale and N. S. Murthy	
Vacuum Free-Fall Method for Preparation of Randomly Oriented XRD Samples	625
J. Ludlam, B. Jacobs and P. K. Predecki	

X. X-RAY TOMOGRAPHY, IMAGING, AND TOPOGRAPHY

Applications of Dual-Energy X-Ray Computed Tomography to Structural Ceramics	629
W. A. Ellingson and M. W. Vannier	
Microtomography Detector Design: It's Not Just Resolution	641
H. W. Deckman, K. L. D'Amico, J. H. Dunsmuir, B. P. Flannery and S. M. Gruner	
Required Corrections for Analysis of Industrial Samples with Medical CT Scanners	651
P. Engler, P. K. Hunt, E. E. Armstrong and W. D. Friedman	
LM-ACT for Imaging RAM Devices in X-Ray Diffraction Topographs	659
W. T. Beard and R. W. Armstrong	

CONTENTS**xxv**

Author Index	667
Subject Index	671