54th Annual Conference on Applications of X-ray Analysis

The Denver X-ray Conference

1–5 August 2005
Sheraton Colorado Springs
Colorado Springs, Colorado U.S.A.

Featuring Cutting Edge
Training
Applications
Techniques
Instrumentation

Exhibits
Workshops
Sessions

Plenary Session: X-ray Imaging

Sponsored by
International Centre for Diffraction Data
54th Annual
Denver X-ray Conference

Sheraton Colorado Springs
Colorado Springs, Colorado  U.S.A.
1–5 August 2005

2005 Denver X-ray Conference Organizing Committee

Randolph Barton, Jr., Emeritus, DuPont Experimental Station, Wilmington, DE
Victor E. Buhrke, Chair, Consultant, Portola Valley, CA
W. Tim Elam, EDAX, Inc., Mahwah, NJ and University of Washington, Seattle, WA
John V. Gilfrich, Emeritus, SFA, Inc./NRL, Bethesda, MD
George J. Havrilla, Los Alamos National Laboratory, Los Alamos, NM
Ting C. Huang, Co-Chair, Emeritus, IBM Almaden Research Center, San Jose, CA
James A. Kaduk, BP Chemicals, Naperville, IL
Terry Maguire, Conference Administrator, International Centre for Diffraction Data, Newtown Square, PA
Scott T. Misture, NYS College of Ceramics at Alfred University, Alfred, NY
I. Cev Noyan, Columbia University, New York, NY
Robert L. Snyder, Georgia Institute of Technology, Atlanta, GA
Mary Ann Zaitz, IBM, Hopewell Junction, NY

Program

This program is also available on the Denver X-ray Conference web page at http://www.dxcicdd.com. The information contained in this program is current as of the printing date. Changes will be communicated at the conference.

Cover: © 1993 the radiograph image of Mrs. Roentgen’s hand, Radiology Centennial, Inc.
The other images were provided by the plenary session speakers.
# 2005 Denver X-ray Conference Program

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Accommodations and Travel

Hotel Information
The 2005 Denver X-ray Conference will be held at the
Sheraton Colorado Springs
2886 South Circle Drive
Colorado Springs, Colorado, 80906 U.S.A.
phone: 719.576.5900
fax: 719.576.7695
Attendees are responsible for making their own reservations. Please identify yourself as a Denver X-ray Conference attendee when booking your reservation. A special conference rate of $110.00 per night plus tax has been contracted for our group. Don’t wait to book your reservation—there are a limited number of rooms available at the special conference rate! Rates are applicable until 7 July 2005 (subject to availability). All reservations must be guaranteed and accompanied by a first night room deposit or guaranteed with a major credit card. Cancellation policy: Deposits (taken either in cash or by credit card) are refunded or credited only if notice is received 48 hours prior to arrival date; guest must obtain cancellation number.

Student Rooms
There are a limited number of hotel rooms being offered to students at a discounted rate of $55 per night plus tax. Student rooms are shared—each room will accommodate two persons and will be equipped with two queen beds. Please visit the Denver X-ray Conference web site: www.dxcicdd.com for a Student Room Authorization form. Student identification will be required. Rooms will be booked on a first come first serve basis.

Need a Roommate?
If you are unable to pay the full price for a hotel room, consider sharing the expenses with a roommate. Check out the Denver X-ray Conference web site: www.dxcicdd.com for information on locating a roommate.

Travel Arrangements
The Denver X-ray Conference has selected Kitty Ward Travel, Inc. as the official travel agent for the conference. Kitty Ward Travel has negotiated special fares with United Airlines and US Airways. A request for air travel is included on page 41 of this program. Please complete the form and fax to Kitty Ward Travel at fax: 610.543.0786 or call 610.543.0680 or 800.752.3718 out of state. If you prefer to arrange your own travel, you may still take advantage of the special airfares by referring to the Denver X-ray Conference number when making your reservations. The number is as follows:

United Airlines       DXC Reference Number: SR45B4-ID# 530CE
US Airways           DXC Reference Number #82683440
Conference Registration Fees*

All attendees must register for the conference, including organizers, chairs, invited speakers, and instructors. Discounted fees will be applied to registrations received before 5 July 2005. The reduced registration fee will only be applied if registration form and payment are received on or before 5 July 2005. Attendees paying by credit card, may pre-register on-line at www.dxcicdd.com. Attendees who are paying by check, or who need to verify their status as either student, unemployed or over 65, need to complete a registration form. Please go to page 43 of this program for the registration form, or print a copy from the conference web site. After completing your form, send it to Denise Flaherty, ICDD, 12 Campus Blvd., Newtown Square, PA 19073-3273 U.S.A. E-mail: dxc@icdd.com, phone: 610.325.9814, fax 610.325.9823. Registration checks should be made payable to ICDD/DXC and enclosed with the registration forms.

<table>
<thead>
<tr>
<th>Conference Registration Fees</th>
<th>Discount</th>
<th>After 5 July</th>
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<tbody>
<tr>
<td>Full week: exhibits, workshops, sessions†</td>
<td>$400</td>
<td>$475</td>
</tr>
<tr>
<td>Monday &amp; Tuesday: exhibits, workshops†</td>
<td>$350</td>
<td>$425</td>
</tr>
<tr>
<td>Wednesday, Thursday &amp; Friday: exhibits, sessions†</td>
<td>$350</td>
<td>$425</td>
</tr>
<tr>
<td>Session organizers, invited speakers &amp; workshop instructors†</td>
<td>$100</td>
<td>$100</td>
</tr>
<tr>
<td>Students, unemployed, and persons 65 and older</td>
<td>$ 75</td>
<td>$ 75</td>
</tr>
<tr>
<td>Exhibits only</td>
<td>$ 75</td>
<td>$ 75</td>
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</table>

*Preregistration fees will only be valid until 5 July 2005. Registration fees will increase after 5 July 2005. †Includes a copy of Volume 49 of Advances in X-ray Analysis on CD-ROM.

Take advantage of this opportunity to include the following orders with your conference registration fee:
- *Advances in X-ray Analysis*, Individual Volumes 40–48 on CD-ROM: $160 each
- **Powder Diffraction** (Individual one year subscription):
  - Domestic: Online: $ 90 | $ 90 | Print: $ 90 | $ 90 | Print & online: $110 | $110
  - Overseas: Online: $ 90 | $ 90 | Print: $115 | $115 | Print & online: $140 | $140
- **Powder Diffraction** (Institution one year subscription):
  - Worldwide: Online: $120 | $120 | Print: $175 | $175 | Print & online: $185 | $185
  - Student online: $35

On-site Registration:

All on-site registrations will be conducted at the Conference Registration Desk, located on the ground floor (level one) of the Sheraton Colorado Springs. See the hotel layout on page 38 of this program for the exact location.

Registration Times:
- Sunday, 31 July 4:00 p.m.–7:00 p.m.
- Monday, 1 August 8:00 a.m.–3:00 p.m.
- Tuesday, 2 August 8:00 a.m.–3:00 p.m.
- Wednesday, 3 August 8:00 a.m.–2:00 p.m.
- Thursday, 4 August 8:00 a.m.–2:00 p.m.

Please Note: Attendees (even those pre-registered) should check in at the Conference Registration Desk for conference materials (name tags, Book of Abstracts, late announcements, etc.).

Cancellation Policy: Cancellations must be submitted in writing to the Conference Coordinator. A full refund will be issued, less a $50 processing fee, if the cancellation is received at least two weeks before the conference (Monday, 18 July 2005). No refunds will be issued for cancellations received after 18 July 2005.
Exhibitor Information

Exhibits will be located in the Grand Ballroom on the ground floor of the hotel. A diagram of the exhibit locations will be available in the Book of Abstracts and on the DXC web page at http://www.dxcicdd.com

**Exhibit Hours:**

<table>
<thead>
<tr>
<th>Day</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Monday</td>
<td>10:00 a.m.–5:00 p.m.</td>
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<tr>
<td>Tuesday</td>
<td>10:00 a.m.–5:00 p.m.</td>
</tr>
<tr>
<td>Wednesday</td>
<td>10:00 a.m.–5:00 p.m.</td>
</tr>
<tr>
<td>Thursday</td>
<td>10:00 a.m.–2:00 p.m.</td>
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**Exhibitors as of April 2005**

- AMPTEK, Inc.
- Blake Industries, Inc.
- Bruker AXS, Inc.
- Brushwellman Electrofusion Products
- Chemplex Industries, Inc.
- Corporation Scientifique Claisse, Inc.
- EDAX, Inc.
- Faxitron X-ray Corporation
- GBC Scientific Equipment Pty Ltd.
- Gresham Scientific Instruments
- Handley Analytical Services
- Hecus X-ray Systems GmbH
- HORIBA Jobin Yvon, Inc.
- Inel, Inc.
- Innov-X Systems, Inc.
- International Centre for Diffraction Data (ICDD)
- Jordan Valley
- Kratos Analytical
- Materials Data, Inc. (MDI)
- Moxtek, Inc.
- Osmic, Inc.
- Oxford Instruments Analytical
- PANalytical
- Radiant Detector Technologies
- Rigaku/MSC, Inc.
- Rocklabs Ltd.
- Spectro Analytical Instruments
- SPEX CertiPrep, Inc.
- Thales Components Corporation
- Thermo Electron
- Wiley
- Xenocs SA
- X-ray Instrumentation Associates LLC (XIA LLC)

All exhibitors are invited to attend the **Exhibitors’ General Meeting**

Wednesday, 3 August 2005, 5:30–6:00 p.m. in the El Paso room.
Evening Technical Sessions and Social Functions

Spouses are welcome to attend all social functions. Evening Mixers and Poster Sessions will be held in the Summit Ballroom on the fourth floor of the hotel.

Sun., 31 July 6:00–8:00 Welcoming Reception
Sponsored by Corporation Scientifique Claise, Moxtek, Shimadzu/Kratos and Wiley

Mon., 1 August 6:00–8:00 XRD Poster Session I
Sponsored by PANalytical

Tues., 2 August 6:00–8:00 MDI and Rigaku/MSC, Inc. Reception & XRD Poster Session II
Sponsored by Materials Data, Inc. and Rigaku/MSC, Inc.

Wed., 3 August 6:00–8:00 XRF Poster Session
Sponsors to be announced

Spouses’ Coffee Hour
All spouses are invited to attend a complementary coffee hour, sponsored by the Denver X-ray Conference. Coffee, tea and pastries will be served in the El Paso room from 9:30 to 10:30 a.m. on Monday and Tuesday. Information on local attractions and activities of interest will be provided.

General Information

Poster Boards
The poster boards used during the evening poster sessions will be 4' high x 6' wide boards. Authors must bring their own thumbtacks or Velcro.

Employment Clearinghouse
We will have a separate bulletin board to announce employment opportunities. Prospective employers and employees should bring announcements with them for posting.

Book of Abstracts
The DXC Book of Abstracts will be available at the Conference Registration Desk.
A better understanding of the Rietveld method as applied to structural characterization and quantitative phase analysis will be emphasized. A brief introduction of the Rietveld method will start the workshop. However, the focus will be on recovering the information content of a powder pattern, optimizing modeling of the individual structural and nonstructural contributions of the data, interpreting and understanding the results. Instrument-sample contributions of all kinds, peak shape behavior and its origin will be covered. Measurement and data acquisition strategies that optimize the structural information content will be examined. Discussions will include quantifying the quality of the results, graphical results and several statistical tools used to judge the quality of the fit between theory and experiment. The major components of this workshop are on problem solving and the identification of needs for improved experimental or modeling methods. Problems that can be assigned to either data quality or deficiencies of the refinement model will be identified. Methods to overcome these problems will be explored.

Two-dimensional diffraction data provides far more information than conventional one-dimensional diffraction data. In recent years, the use of two-dimensional diffraction has increased due to the advances in detector technology, point beam X-ray optics, software development and computing power. This workshop covers recent progress in two-dimensional X-ray diffraction in terms of detector technology, geometry, and configuration of the two-dimensional diffractometer and various applications such as phase ID, texture, stress, crystallinity, combinational screening and thin film analysis.

This workshop will cover the basics of XRF sample preparation considerations starting with a discussion of the error involved in theoretical and practical instances that sample preparation can overcome or reduce, followed by an overview of sampling techniques and equipment needed for sampling in nature and in the lab. The practical application of preparing powder briquettes and fusion beads for catalysts will then be presented, highlighting the techniques and equipment used for manual and automated methods. Lastly, the selection, care and use of flux, crucibles and molds for various fusion procedures will be reviewed. This session will highlight the cleaning and polishing procedures needed to extend the life of the crucibles and molds. The effect of thickness, age, and degree of wear will be discussed with respect to length of service and performance.
Monday p.m. Workshops

**XRD**

W4  Rietveld Applications II—Advanced  
Pikes Peak 1&2  

*Organizers & Instructors:*

- **A. Kern**, Bruker AXS GmbH, Karlsruhe, Germany  
- **J. Faber**, International Centre for Diffraction Data, Newtown Square, PA  
- **L. Cranswick**, National Research Council Canada, Chalk River, Ontario, Canada  
- **R. Von Dreele**, Argonne National Laboratory, Argonne, IL  
- **F. Needham**, International Centre for Diffraction Data, Newtown Square, PA  

Continuation of W1 Rietveld Applications I—Beginner.

**XRF**

W5  Specimen Preparation II  
Centennial  

*Organizers & Instructors:*

- **D. Broton**, Construction Technology Labs, Skokie, IL  
- **E. Elabd**, Grace Davison, Baltimore, MD  
- **J. Pitre**, Corporation Scientifique Claisse, Ste-Foy (Quebec), Canada  

Continuation of W3 Specimen Preparation I

W6  Monte Carlo Techniques in XRF  
Pikes Peak 3&4  

*Organizer & Instructors:*

- **R.P. Gardner**, North Carolina State University, Raleigh, NC  
- **A. Sood**, Los Alamos National Laboratory, Los Alamos, NM  
- **M. Mantler**, Vienna University of Technology, Vienna, Austria  
- **W. Guo**, North Carolina State University, Raleigh, NC  

This workshop will concentrate on the practical aspects of Monte Carlo simulation for XRF applications. This will include how an individual particle or photon is tracked in a sample from emission to detection, how tallies pertinent to XRF predictions are obtained, statistical aspects of the Monte Carlo predictions, geometry considerations, random number generation in computers, cross section accessing, and variance reduction techniques. A review will also be given of the capabilities of the most popular general purpose codes like MCNP for XRF use.
**XRD & XRF**

**W7** X-ray Microtomography  
Pikes Peak 1&2  

*Organizer & Instructor:*  
**S.R. Stock,** Northwestern University Medical School, Chicago, IL  
**G.R. Davis,** Queen Mary, University of London, London, UK

Computed tomography (CT) revolutionized medical diagnostics, and high resolution CT (microCT) promises the same impact for small samples, providing non-invasive 3D microstructure quantification with resolutions to one micrometer or smaller. In this workshop, we will introduce microCT (lab and synchrotron systems) and consider factors influencing its practical use as a 3D materials imaging modality. Repeated interrogation of the same sample will be one emphasis in the examples presented, and a second will be analysis “tricks” which have been employed.

**XRD**

**W8** Diffraction Analysis of Stress and Strain  
Pikes Peak 3&4  

*Organizer & Instructor:*  
**I.C. Noyan,** Columbia University, Dept. of Applied Physics and Mathematics, New York, NY  
**C.C. Goldsmith,** IBM Corporation, Microelectronics Division, Hopewell Junction, NY

This workshop is designed to introduce engineers to practical stress/strain analysis with diffraction. We will cover basic theory, data acquisition and analysis tips, instrumental and statistical errors as well as a few case studies.

**XRF**

**W9** Quantitative XRF I  
Gold Camp  

*Organizer & Instructors:*  
**M. Mantler,** Vienna University of Technology, Vienna, Austria  
**B. Vrebos,** PANalytical, Almelo, The Netherlands  
**W.T. Elam,** EDAX, Mahwah, NJ and University of Washington, Seattle, WA

Topics will include:  
- Fundamentals.  
- Classical fundamental parameter models and mathematical foundation.  
- Compensation Methods.  
- Error analysis, iteration schemes, determination of elements by difference.

**W10** Basic XRF  
Centennial  

*Organizer & Instructor:*  
**L. Creasy,** Timet North American Operation, Morgantown, PA  
**G.J. Havrilla,** Los Alamos National Laboratory, Los Alamos, NM

This workshop is intended to provide a basic background of the principles of XRF, specifically directed to those new to the field. It will consist of an general overview of the technique, followed by more specific details of particular applications by experts in those applications, to provide an understanding of the use of the principles previously described.
There are a myriad of X-ray optics on the market and each one has its own unique capabilities in terms of X-ray spectrometry. This workshop will provide the basic knowledge about X-ray optics specifically multilayer optics, crystal optics and polycapillary optics. One objective is to help users understand the basic working principles and performance characteristics of these optics. Attendees will learn the function of an optical system in an X-ray instrument. Applications of these optics and their capabilities will be presented.

Line broadening analysis has evolved into a powerful technique for assessing crystallite size, strain, and defects in materials. The workshop will focus on the determination of these properties by Rietveld refinement and other Whole Powder Pattern Fitting (WPPF) programs. A brief theoretical overview will be followed by a practical tutorial with recipes and examples of the determination of crystallite-size distribution and dislocation density in different materials.

Topics will include: computed (theoretical) influence coefficients and their mathematical relationship to fundamental parameter models and a detailed discussion and comparison of selected influence coefficients methods.

The Energy Dispersive X-ray Fluorescence (EDXRF) Workshop provides a comprehensive review of the basic fundamentals for both the beginner and experienced X-ray spectroscopist. Topics to be covered are instrumentation including traditional EDXRF spectrometer and the newer polarized X-ray systems, current state of the detectors, X-ray tubes along with options such as filters and secondary targets. Spectral processing for Si escape peaks, sum peaks and background options for both qualitative and quantitative analysis will be presented. For quantitative analyses, traditional empirical plus fundamental parameter, semi quant and standardless calibration methods will be discussed.
Poster Sessions:
Monday, 1 August–Wednesday, 3 August
6:00–8:00 p.m.

Held in conjunction with evening receptions in the Summit Ballroom on the fourth floor of the hotel.

Poster presenters are invited to display their posters in the exhibit hall (Grand Ballroom) on the day following their premier at the evening poster session:

- Monday evening poster presenters are invited to display their posters in the exhibit hall on Tuesday from 10:00 a.m. – 2:00 p.m.
- Tuesday evening poster presenters are invited to display their posters in the exhibit hall on Wednesday from 10:00 a.m. – 2:00 p.m.
- Wednesday evening poster presenters are invited to display their posters in the exhibit hall on Thursday from 10:00 a.m. – 2:00 p.m.

A designated poster board will be assigned for each author. Please remove your poster from the exhibit hall by 2:00 p.m.

Oral Sessions:
Wednesday, 3 August–Friday, 5 August
Times vary

Please consult the Program for presentation times
The XRD Poster Session I will be held in conjunction with the PANalytical mixer.

Chairs: R.L. Snyder, Georgia Institute of Technology, Atlanta, GA
       S.T. Misture, NYS College of Ceramics at Alfred University, Alfred, NY

Session chairs will select the two best papers for awards.

METHOD/TECHNIQUE

D068  SAXSess—A TOOL FOR NANOSTRUCTURED MATERIALS
       H. Schnablegger, Anton-Paar GmbH, Graz, Austria
       O. Glatter, University of Graz, Graz, Austria
       T. Röder, Lenzing AG, Lenzing, Austria

D074  EXPERIMENTAL STUDY OF X-RAY ENERGY SPECTRUM FORMED BY PLANAR WAVEGUIDE-
       RESONATOR WITH SPECIFIC ELEMENT COMPOSITION REFLECTORS
       V.K. Egorov, E.V. Egorov, IMT RAS, Chernogolovka, Moscow District, Russia

D099  PROPER SELECTION OF THIN X-TRANSPARENT FOILS FOR TRANSMISSION AND
       REFLECTION POWDER DIFFRACTOMETRY
       M. Fransen, A. van Lemel, PANalytical, Almelo, The Netherlands

D006  MEASUREMENT OF STRAIN AND LATTICE TILT AT THE MARGINS OF THIN FILM ISLANDS ON
       SINGLE-CRYSTAL SUBSTRATES BY DOUBLE-CRYSTAL X-RAY TOPOGRAPHY
       P. M. Adams, The Aerospace Corporation, Los Angeles, CA

D024  VISUAL REPRESENTATIONS OF STRESS TENSORS OBTAINED FROM X-RAY DIFFRACTION
       MEASUREMENTS
       M Yaman, M Harting, University of Cape Town, Cape Town, South Africa
       R.D. Kriz, Virginia Polytechnic Institute and State University, Blacksburg, VA

D056  TOPOGRAPHIC TESTING OF CRYSTALS FOR THE ADVANCED PHOTON SOURCE USERS
       S. Krasnicki, J. Maj, A. Macrander, Y. Zhong, APS, Argonne National Laboratory, Argonne, IL

D042  3D INTERACTIVE DATA LANGUAGE POLE FIGURE VISUALIZATION
       C.S. Frazer, M.A. Rodriguez, R.G. Tissot, Sandia National Laboratories, Albuquerque, NM

D033  RESIDUAL STRESS MEASUREMENT OF FIBER TEXTURE MATERIALS NEAR SINGLE CRYSTAL
       T. Mori, M. Gotoh, T. Sasaki, Y. Hirose, Kanazawa University, Kanazawa, Ishikawa, Japan

D001  THE METHOD OF IMAGING AND 3-D DIAGNOSTICS OF ACTIVE AND PASSIVE SOURCE OF
       X-RADIATION IN BIOMEDICAL INVESTIGATION BY THE PHENOMENON OF RADIATION
       INTENSITY CORRELATION
       V.I. Vysotskii, M. Vysotskyy, Kiev Shevchenko University, Kiev, Ukraine

D060  THIN POLYMER FILM STRUCTURE USING RESONANT SOFT X-RAY CONTRAST VARIATION
       Laboratory, Los Alamos, NM
       J.B. Kortright, Los Alamos National Laboratory, Los Alamos, NM and Lawrence Berkeley National Laboratory,
       Berkeley, CA
XRD Poster Session I, Monday, 1 August
Summit Ballroom  •  6:00 p.m.–8:00 p.m.

D083 MICROABSORPTION OR ABSORPTION CONTRAST IN ‘REAL’ MATERIALS
A.M. Brayko, R.S. Winburn, Minot State University, Minot, ND

D011 X-RAY ANALYSIS OF SiC
K.W. Kirchner, U.S. Army Research Laboratory, Adelphi, MD

INSTRUMENTATION

D008 DEVELOPMENT OF MOBILE TYPE X-RAY STRESS MEASURING EQUIPMENTS USING EDXDM
(ENERGY DISPERSIVE X-RAY DIFFRACTION METHOD)
Y. Hosokawa, Y. Miyoshi, H. Tanabe, T. Takamatsu, T. Fujinami, The University of Shiga Prefecture,
Shiga, Japan

D063 OPTICAL PROPERTIES OF TWO-LENS SYSTEM ON THE BASE OF HARD X-RAY ZONE PLATES
A.V. Kuyumchyan, A.A. Isoyan, S.M. Kouznetsov, V.V. Aristov, E.V. Shulakov, Institute of Microelectronics
Technology and High Purity Materials of Russian Academy of Science, Chernogolovka, Russian Federation
A. Snigirev, I. Snigireva, ESRF, Grenoble, France
V. Kohn, RRC Kurchatov Institute, Moscow, Russia

D081 DEVELOPMENT OF FOCUSING OPTICS FOR X-RAY DIFFRACTION
H. Huang, W.M. Gibson, Z. Chen, X-ray Optical Systems, Inc., East Greenbush, NY
P. Van Roey, Wadsworth Center, New York State Dept. of Health, Albany, NY

D097 HIGH FLUX MONOCHROMATIC X-RAY OPTICS FOR XRD
Z.W. Chen, H. Huang, W.M. Gibson, X-ray Optical Systems, Inc., East Greenbush, NY

D025 OPTIMAL DESIGN OF TRANSMISSION GRATING FOR X-RAY TALBOT INTERFEROMETER
W. Yashiro, A. Momose, A. Masada, The University of Tokyo, Tokyo, Japan

THEORY

D038 PHASE MIXTURE DETECTION BY FUZZY CLUSTERING OF X-RAY POWDER DIFFRACTION
DATA
T. Degen, D. Götz, PANalytical B.V., Almelo, The Netherlands

D020 THEORETICAL INTERPRETATION OF THE EXPERIMENTS WITH HIGH-RESOLUTION PARAMETRIC X-RAYS
I.D. Feranchuk, A.S. Lobko, Belarus State University, Minsk, Belarus
A.P. Ulyanenkov, Bruker AXS GmbH, Karlsruhe, Germany
The XRD Poster Session II will be held in conjunction with the MDI and Rigaku mixer.

Chairs: T.C. Huang, Emeritus, IBM Almaden Research Center, San Jose, CA
       J.A. Kaduk, BP Chemicals, Naperville, IL

Session chairs will select the two best papers for awards.

**IMAGING**

D028  SCATTERING ENHANCED RADIOGRAPHY FOR DETERMINATION OF SIZE AND SHAPE OF POLYMER ZONES IN POLYMERS
      G.A. Maier, G. Wallner, University of Leoben, Leoben, Austria
      P. Fratzl, Max Planck Institute of Colloids and Interfaces, Potsdam, Germany

C10  X-RAY TOMOGRAPHY SYSTEM, AUTOMATION AND REMOTE ACCESS AT BEAMLINE 2BM OF THE ADVANCED PHOTON SOURCE
     F. De Carlo, B. Tieman, APS, Argonne National Laboratory, Argonne, IL

D096  VALUE OF NUMERICAL ANALYSIS OF LINEAR ATTENUATION COEFFICIENTS IN MICROCTOMOGRAPHY
      S.R. Stock, Northwestern University, Chicago, IL
      F. DeCarlo, APS, Argonne National Laboratory, Argonne, IL

D014  INVESTIGATION OF LATERAL STRUCTURED INTERFACES WITH DXRS AND SPM
      I. Busch, J. Stümpel, Physikalisch-Technisch Bundesanstalt, Braunschweig, Germany

C03  DIRECT DETERMINATION OF ATOM POSITIONS IN NON-PERFECT CRYSTALS WITH KINEMATICAL X-RAY STANDING WAVES
     M. Tolkiehn, D.V. Novikov, HASYLAB at DESY, Hamburg, Germany

D064  REPRODUCTION OF HOLOGRAM IMAGE USING A ZONE PLATE FOR HARD X-RAY RADIATION
      A.V. Kuyumchyan, A.A. Isoyan, V.V. Aristov, Institute of Microelectronics Technology and High Purity Materials of RAS, Chernogolovka, Russian Federation
      A. Yu. Souvorov, T. Ishikawa, SPring-8, Hyogo, Japan
      K. Trouni, E. Sarkisian, International Academy of Science and Technology, Glendale, CA

**MATERIALS/ORGANICS**

D091  POLYMORPHIC ANALYSIS OF TEGAFUR
      F. Needham, J. Faber, T.G. Fawcett, ICDD, Newtown Square, PA
      D.H. Olson, Rutgers University, New Brunswick, NJ
      R.E. Needham, Food and Drug Administration, Philadelphia, PA

D007  DETECTION OF POLYMORPHISM BY POWDER X-RAY DIFFRACTION: INTERERENCE BY PREFERRED ORIENTATION (UNCOMMON POLYMORPHIC ARTIFACTS IN POWDER X-RAY DIFFRACTION DETERMINATION)
      M. Davidovich, R.P. Scaringe, S. Yin, Bristol-Myers Squibb Pharmaceutical Research Institute, New Brunswick, NJ
      J. DiMarco, J.Z. Gougoutas, Bristol-Myers Squibb Pharmaceutical Research Institute, Lawrenceville, NJ
      I. Vitez, CardinalHealth, Somerset, NJ
D016  X-RAY DIFFRACTION AND THERMAL STUDIES ON PENTAGLYCERINE AND NEOPENTYLGLYCOL SOLID SOLUTIONS  
W.-M. Chien, D. Chandra, University of Nevada Reno, Reno, NV

D046  CHARACTERIZATION OF THE PHYSICAL FORM OF DRUG IN PHARMACEUTICAL FILM-COATED TABLETS AND CALCULATION OF THE DEPTH OF PENETRATION OF X-RAYS  
H. Yamada, Mitsubishi Pharma Co., Kashima, Japan and University of Minnesota, Minneapolis, MN  
R. Suryanarayanan, University of Minnesota, Minneapolis, MN

D065  SYNTHESIS AND CHARACTERIZATION OF p-ANISIDINE-OXALATE COMPLEXES  
B.K. Raghu, Andhra University, Andhra Pradesh, India

MATERIALS/INORGANICS

D017  HIGH TEMPERATURE STUDIES OF PHASE EVOLUTION OF Ba2RCu3O6+x FILMS PREPARED USING THE “BaF2 PROCESS”  
W. Wong-Ng, I. Levin, J. Ritter, L.P. Cook, M. Vaudin, NIST, Gaithersburg, MD  
R. Feenstra, A. Goyal, ORNL, Oak Ridge, TN

D018  CRYSTALLOGRAPHY AND CRYSTAL CHEMISTRY OF THE “GREEN PHASE” (Ba1-xSrx)R2CuO5 (R=LANTHANIDES AND Y)  
Z. Yang, W. Wong-Ng, Q. Huang, L.P. Cook, NIST, Gaithersburg, MD  
J.A. Kaduk, BP Chemicals, Naperville, IL  
T. Haugan, AFRL, Wright-Patterson, OH  
R.A. Young, Georgia Institute of Technology, Atlanta, GA

D058  DETERMINATION OF CATION DISTRIBUTIONS IN Mn3O4 BY ANOMALOUS X-RAY POWDER DIFFRACTION  
Y. Xiao, D.E. Wittmer, Southern Illinois University, Carbondale, IL and The University of Chicago, Chicago, IL  
F. Izumi, National Institute for Materials Science, Tsukuba, Ibaraki, Japan  
S. Mini, Northern Illinois University, DeKalb, IL and Argonne National Laboratory, Argonne, IL  
T. Graber, P.J. Viccaro, The University of Chicago, Chicago, IL

D075  PHASE STABILITIES OF Zr2Fe and Zr3Fe HYDRIDES  
D. Chandra, University of Nevada Reno, Reno, NV  
J.R. Wermer, S.N. Paglieri, J.I. Abes, Los Alamos National Laboratory, Los Alamos, NM  
M. Coleman, Los Alamos National Laboratory, Los Alamos, NM and Altair Technologies, Reno, NV  
T. Udovic, NIST, Gaithersburg, MD  
A. Payzant, Oak Ridge National Laboratory, Oak Ridge, TN

D076  MICROSTRAIN AND DOMAIN SIZE MEASUREMENTS OF V-0.5 at. %C HYDRIDES  
D. Chandra, M. Coleman, J. Lamb, A. Sharma, W.N. Cathey, University of Nevada Reno, Reno, NV  
J.R. Wermer, S.N. Paglieri, Los Alamos National Laboratory, Los Alamos, NM  
R.C. Bowman, Jr., NASA Jet Propulsion Laboratory, Pasadena, CA  
F.E. Lynch, HCI, Littleton, CO

D077  THERMAL LATTICE EXPANSION IN EPITAXIAL SrTiO3(100) ON Si(100)  
D.E. McCready, V. Shutthanandan, C. Wang, S. Thevuthasan, Pacific Northwest National Laboratory, Richland, WA  
Y. Liang, Freescale Semiconductor, Inc., Tempe, AZ
D079 TEMPERATURE DEPENDENCE OF RESIDUAL STRESS IN TITANIUM NITRIDE COATINGS ON HAYNES 188 SUPERALLOY  
S.H. Ferguson, H.W. King, *University of Victoria*, Victoria, Canada

D080 CHARACTER OF THE HIGH-TEMPERATURE STRUCTURAL CHANGES IN CsD$_2$PO$_4$ and RbD$_2$PO$_4$  
W. Bronowska, *Institute of Physics, Wrocław University of Technology*, Wrocław, Poland  
A. Pietraszko, *Institute of Low Temperature and Structure Research, Polish Academy of Sciences*, Wrocław, Poland

D069 RESIDUAL STRESS DISTRIBUTION IN GTA SPOT WELDED Ti$_6$AlV$_4$V DISKS  
J. Sariel, I. Dahan, *Nuclear Research Center*, Negev, Beer-Sheva, Israel  
M. Szanto, A. Stern, *Ben-Gurion University*, Beer-Sheva, Israel

D050 COMPARISON OF TEXTURE IN COPPER AND ALUMINUM THIN FILMS DETERMINED BY XRD AND EBSD  
D. Balzar, *NIST*, Boulder, CO and *University of Denver*, Denver, CO

D082 DEPTH PROFILE STUDY OF THE COMPOSITION OF URINARY STONES AND CRYSTALS FROM CANINES AND FELINES USING X-RAY DIFFRACTION  
K.R. Fjeldahl, R.S. Winburn, *Minot State University*, Minot, ND

D032 RESIDUAL STRESS MEASUREMENT OF CEMENTITE PHASE IN PLASTICALLY DEFORMED CARBON STEELS  
K. Yagi, L. Che, M. Gotoh, Y. Hirose, *Kanazawa University*, Ishikawa, Japan
The XRF Poster Session will be held in conjunction with the evening mixer. Sponsor to be announced.

Chairs: J.V. Gilfrich, Emeritus, SFA, Inc./NRL, Bethesda, MD
       W.T. Elam, EDAX, Mahwah, NJ and The University of Washington, Seattle, WA

Session chairs will select the three best papers for awards.

APPLICATIONS

F11 IDENTIFICATION OF PAINTING MATERIALS USED FOR MURAL PAINTINGS BY IMAGE ANALYSIS AND XRF
S. Shirono, Y. Hayakawa, National Research Institute for Cultural Properties, Tokyo, Japan

F17 COMBINING MICRO X-RAY FLUORESCENCE AND INFRARED IMAGING SPECTROSCOPIES FOR THE UNDERSTANDING OF COMPLEX CHEMICAL SYSTEMS
B.M. Patterson, G.J. Havrilla, Los Alamos National Laboratory, Los Alamos, New Mexico

F40 X-RAY FLUORESCENCE ANALYSIS OF URANIUM ALUMINUM ALLOYS
D.M. Missimer, A.R. Jurgensen, R.L. Rutherford, Savannah River National Laboratory, Aiken, SC

F43 CHARACTERIZING SEMICONDUCTOR THIN FILMS WITH A CONFOCAL MICRO X-RAY FLUORESCENCE SPECTROMETER
G.J. Havrilla, E.P. Hastings, Los Alamos National Laboratory, Los Alamos, NM
C. Sparks, Process Characterization Laboratory, ATDF, Austin, TX

F52 RESEARCHES ON NEURODEGENERATION USING TECHNIQUES BASED ON SYNCHROTRON RADIATION
J. Chwiej, M. Szczerebowska-Boruchowska, S. Wójcik, M. Lankosz, Z. Stegowski, AGH-University of Science and Technology, Krakow, Poland
D. Adamek, A. Krygowska-Wajs, B. Tomik, Z. Setkowicz, Jagiellonian University, Krakow, Poland
S. Bohic, J. Susini, A. Simionovic, D. Eihert, ESRF, Grenoble, France
G. Falkenberg, HASYLAB at DESY, Hamburg, Germany

F55 PARAMETER STUDIES FOR AN OPTIMIZED XRF-DETERMINATION OF Pb IN BONE
P. Wobrauschek, N. Cernohlawek, C. Streli, N. Zoeger, Atominstitut, TU-Wien, Vienna, Austria

F57 TXRF ANALYSIS OF LOW Z ELEMENTS IN ENVIRONMENTAL SAMPLES
H. Hoefler, C. Streli, P. Wobrauschek, Atominstitut of the Austrian Universities, TU-Wien, Vienna, Austria
G. Zaray, EÖTVÖS University, Budapest, Hungary

F58 ULTRATRACE ELEMENT ANALYSIS WITH SR-TXRF AT BEAMLINE L FOR AEROSOL AND AL-OXIDE SAMPLES
J. Broekaert, B. Peschel, U. Fittschen, Universität Hamburg, Hamburg, Germany
C. Streli, P. Wobrauschek, C. Jokubonis, Atominstitut, TU-Wien, Vienna, Austria
G. Pepponi, ITC-irst, Trento, Italy
G. Falkenberg, HASYLAB at DESY, Hamburg, Germany

F59 CHARACTERISATION OF ARSENIC ULTRA SHALLOW JUNCTIONS BY GRAZING INCIDENCE FLUORESCENCE EXAFS
G. Pepponi, D. Giubertoni, M. Bersani, ITC-irst, Trento, Italy
C. Streli, C. Jokubonis, P. Wobrauschek, Atominstitut, TU-Wien, Vienna, Austria
G. Falkenberg, HASYLAB at DESY, Hamburg, Germany
APPLICATION OF THE TXRF METHOD FOR THE ELEMENTAL ANALYSIS OF THE CEREBROSPINAL FLUID AND SERUM IN AMYOTROPHIC LATERAL SCLEROSIS
B. Ostachowicz, M. Lankosz, AGH, University of Science and Technology, Krakow, Poland
B. Tomik, D. Adamek, Jagiellonian University, Krakow, Poland
P. Wobrauschek, C. Streli, P. Kregsamer, Atominsttitut, TU-Wien, Vienna, Austria

GRAZING-INCIDENCE X-RAY FLUORESCENCE ANALYSIS OF MICROELECTROMECHANICAL SYSTEMS
J. Naud, Université Catholique de Louvain-La-Neuve, Louvain-La-Neuve, Belgium
R.Y. Fillit, Ecole Nationale Supérieure des Mines de Saint-Etienne, Saint-Etienne, France

DETERMINATION OF THE ELEMENT DISTRIBUTION IN SAUROPOD BONES BY MICRO-XRF
N. Cernohlawek, C. Jokubonis, C. Streli, P. Wobrauschek, Atominsttitut, TU-Wien, Vienna, Austria
P.M. Sander, University of Bonn, Bonn, Germany

BROADBAND X-RAY RADIOGRAPHY APPLIED TO MULTIPHASE FLOW MEASUREMENTS
K. Fezzaa, W-K. Lee, J. Wang, APS, Argonne National Laboratory, Argonne, IL

XRF COMBINED WITH NEXAFS ANALYSIS IN THE SOFT X-RAY RANGE: A CONTRIBUTION TO THE SPECIATION OF IRON IN MINERALS AT THE L$_{3,2}$ EDGES
B. Beckhoff, G. Ulm, Physikalisch-Technische Bundesanstalt, Berlin, Germany
M. Wilke, I. Sommerweiss, Universität Potsdam, Golm, Germany

CHARACTERISATION OF LARGE AREA AVALANCHE PHOTODIODES FOR X-RAY SPECTROMETRY
L.M.P. Fernandes, J.M.F. dos Santos, Universidade de Coimbra, Coimbra, Portugal
J.A.M. Lopes, Universidade de Coimbra, Coimbra, Portugal and Instituto Superior de Engenharia de Coimbra, Coimbra, Portugal

AUTOMATED NANOLITER DRIED SPOT SAMPLE PREPARATION METHOD FOR X-RAY FLUORESCENCE LIQUID SAMPLE ANALYSIS
T.C. Miller, Z. Chen, X-ray Optical Systems, Inc., East Greenbush, NY
E.P. Hastings, G.J. Havrilla, Los Alamos National Lab, Los Alamos, NM

ELECTRIC FIELD INFLUENCE ON EMISSION OF CHARACTERISTIC X-RAY FROM Al$_2$O$_3$ TARGETS BOMBARDED WITH SLOW Xe$^+$ IONS
J. C. Rao, M. Song, K. Mitsuishi, M. Takeguchi, K. Furuya, National Institute for Materials Science, Ibaraki, Japan

SURFACE MONITOR: A NEW INSTRUMENT FOR IN SITU XRD-XRF AND OPTICAL MEASUREMENT
P. Plescia, G.M. Ingo, ISMN-CNR, National Research Council of Italy, Rome, Italy
A. Bianco, Assing Research Center, Rome, Italy
C05  LOBSTER EYE OPTICS FOR COLLECTING RADIATION OF A LASER-PLASMA SOFT X-RAY SOURCE BASED ON A GAS PUFF TARGET
A. Bartnik, H. Fiedorowicz, R. Jarocki, J. Kostecki, R. Rakowski, M. Szczurek, Military University of Technology, Warsaw, Poland
L. Pína, L. Švéda, Czech Technical University, Prague, Czech Republic
A. Inneman, REFLEX s.r.o., Prague, Czech Republic

C06  X-RAY IMAGING OF AN ELONGATED GAS PUFF TARGET TO BE USED IN X-RAY LASER EXPERIMENTS
A. Bartnik, H. Fiedorowicz, R. Jarocki, J. Kostecki, R. Rakowski, M. Szczurek, Military University of Technology, Warsaw, Poland

F78  CROSS SECTIONS OF X-RAY RESONANT RAMAN SCATTERING (RRS) ON NICKEL FOR POLARIZED AND UNPOLARIZED RADIATION
Ch. Zarkadas, A.G. Karydas, Institute of Nuclear Physics, N.C.S.R. “Demokritos”, Athens, Greece
M. Müller, B. Beckhoff, M. Kolbe, R. Fliegauf, G. Ulm, Physikalisch-Technische Bundesanstalt, Berlin, Germany

F05  X-RAY PROJECTION AND MICROBEAM USING AN X-RAY WAVE GUIDE RESONATOR
Y. Hosokawa, X-ray Precision, Inc. Kyoto, Japan
J. Kawai, P. Karimov, Kyoto University, Kyoto, Japan
Y. Miyoshi, H. Tanabe, T. Takamatsu, The University of Shiga Prefecture, Shiga, Japan

QUANTITATIVE XRF

F77  QUANTITATIVE INVESTIGATION OF THE ENHANCEMENT OF X-RAY FLUORESCENCE OF LIGHT ELEMENTS BY PHOTOELECTRON SECONDARY EXCITATION
B. Beckhoff, M. Gerlach, M. Kolbe, M. Müller, G. Ulm, Physikalisch-Technische Bundesanstalt, Berlin, Germany
N. Kawahara, T. Yamada, Rigaku Industrial Corporation, Osaka, Japan
M. Mantler, Vienna University of Technology, Vienna, Austria

F23  FUNDAMENTAL PARAMETER PROGRAMS: ALGORITHMS FOR THE DESCRIPTION OF K-, L- AND M SPECTRA OF X-RAY TUBES
H. Ebel, Vienna University of Technology, Vienna, Austria

F28  MATERIALS IDENTIFICATION ON THE BASE OF DISCRETE X-RAY SPECTRA
I.A. Brytov, R.I. Plotnikov, A.A. Rechinski, NPP “Bourevestnik”, Saint Petersburg, Russia

F47  MONTE-CARLO MODELING OF SILICON X-RAY DETECTORS
B. Cross, CrossRoads Scientific, El Granada, CA
G. Bale, B. Lowe, R. Sareen, Gresham Scientific Instruments, Ltd., Buckinghamshire, United Kingdom
MATERIALS

F10  DEVELOPMENT OF PLASTIC CERTIFIED REFERENCE MATERIALS FOR XRF ANALYSIS
K. Nakano, Meiji University, Kanagawa Japan and Osaka City University, Osaka, Japan and PRESTO, JST, Saitama, Japan
K. Tsuji, Osaka City University, Osaka, Japan and PRESTO, JST, Saitama, Japan
T. Nakamura, Meiji University, Kanagawa, Japan

F19  QUANTIFYING PEPTIDE-METAL BINDING ON BEAD BASED LIBRARIES
E.M. Minogue, T.P. Taylor, G.J. Havrilla, V.M. Montoya, Los Alamos National Laboratory, Los Alamos, NM
Plenary Session: X-ray Imaging
Wednesday, 3 August, 8:30 a.m.–12:30 p.m.
Summit Ballroom
Fourth floor of the hotel

Organized by:
R. Barton, Jr., Emeritus, DuPont Experimental Station, Wilmington, De
S. Stock, Northwestern University Medical School, Chicago, IL

8:30 Welcoming Remarks
Chairman of the Denver X-ray Conference,
Victor E. Buhrke, Consultant, Portola Valley, CA

8:35 Presentation of Awards

2005 Barrett Award
presented to:
Brian K. Tanner, University of Durham, Durham, UK and
D. Keith Bowen, Bede Scientific Instruments, Ltd., Durham, UK
presented by: I.C. Noyan, Columbia University, New York, NY

2005 Jerome B. Cohen Student Award
(winner to be announced at the plenary session)
presented by: I.C. Noyan, Columbia University, New York, NY

2005 Jenkins Award
presented to:
Victor E. Buhrke, Consultant, Portola Valley, CA
presented by: J.V. Gilfrich, Emeritus, SFA, Inc./NRL, Bethesda, MD

8:55 Plenary Session Remarks
R. Barton, Jr., Emeritus, DuPont Experimental Station, Wilmington, De
S. Stock, Northwestern University Medical School, Chicago, IL

The following are the invited papers to be presented during the plenary session:

9:00 C19 BIOMEDICAL X-RAY IMAGING, CURRENT STATUS AND SOME FUTURE CHALLENGES
E.L. Ritman, Mayo Clinic College of Medicine, Rochester, MN

9:45 C24 WHERE ARE WE AFTER THE DECADE-LONG RENAISSANCE IN X-RAY IMAGING?
A. Snigirev, European Synchrotron Radiation Facility, Grenoble, France

10:30 Break

11:00 C16 X-RAY BACKSCATTER IMAGING: PHOTOGRAPHY THROUGH BARRIERS
J. Callerame, American Science & Engineering, Inc., Billerica, MA

11:45 C18 GEOSCIENCE APPLICATIONS OF SYNCHROTRON X-RAY IMAGING
M.L. Rivers, Department of Geophysical Sciences and Center for Advanced Radiation Sources,
University of Chicago, Chicago, IL
1:40 F06 A NEW GENERATION OF BRAGG POLARIZATION OPTICS IN EDXRF
J. Heckel, SPECTRO A.I., Kleve, Germany

2:00 F68 DEVELOPMENT TRENDS IN THE DESIGN OF WDXRF SPECTROMETERS AND THEIR IMPLEMENTATION IN THE NEW 9900 THERMOARL SIM/SEQ INSTRUMENT
A. Buman, Thermo Electron, Dearborn, MI

2:20 F32 WEIGHING MACHINE AND FLUX DISPENSER, Theant...TAKE THE WEIGHT OFF YOUR MIND!
F. Bouker, Corporation Scientifique Claisse Inc., Sainte-Foy (Quebec), Canada

2:40 F46 ADVANCEMENTS IN PORTABLE XRF INSTRUMENTATION

3:00 F53 AN XRF MEASURING PLATFORM UTILIZING A MINIATURE X-RAY TUBE AND A SILICON PIN DIODE DETECTOR

3:20 Break

3:40 F33 MULTI-SPECTRAL XRF COUNTING: SQUEEZE TWICE AS MUCH INFORMATION FROM YOUR DETECTOR
W.K. Warburton, P. Grudberg, J. Harris, XIA LLC, Newark, CA
B. Cross, CrossRoads Scientific, El Granada, CA

4:00 D104 DEFINITIVE MINERALOGICAL ANALYSIS ON MARS USING X-RAY DIFFRACTION
P. Sarrazin, inXitu, Mountain View, CA
D. Blake, NASA Ames Research Center, Moffett Field, CA
D. Bish, Indiana University, Bloomington, IN
D. Vaniman, S. Chipera, Los Alamos National Laboratory, Los Alamos, NM
M. Gailhanou, Faculté des Sciences et Techniques de St Jérôme, Marseille, France

4:20 D098 THE FOCUSING MIRROR: NEW POSSIBILITIES FOR TRANSMISSION POWDER XRD
M. Fransen, D. Beckers, V. Kogan, S. Prugovecki, PANalytical, Almelo, The Netherlands

4:40 D010 DHS1100—A NEW HIGH TEMPERATURE STAGE FOR MULTIPURPOSE 4-CIRCLE X-RAY GONIOMETERS
R. Resel, M. Koini T. Haber, Graz University of Technology, Graz, Austria
J. Keckes, University Leoben, Leoben, Austria
P. Hofbauer, Anton Paar GmbH, Graz, Austria

5:00 C14 AN X-RAY NANODIFFRACTION TECHNIQUE FOR INDIVIDUAL CRYSTALLINE NANOOBJECTS
Y. Xiao, Z. Cai, B. Lai, Y.S. Chu, Argonne National Laboratory, Argonne, IL
2:00 D012 PHASE IMAGING WITH AN X-RAY TALBOT INTERFEROMETER—Invited
A. Momose, I. Koyama, W. Yashiro, The University of Tokyo, Tokyo, Japan
Y. Suzuki, SPring-8, Hyogo, Japan
T. Hattori, University of Hyogo, Hyogo, Japan

2:30 C22 QUANTITATIVE SUB-100nm PHASE-CONTRAST IMAGING USING AN SEM-BASED
FULL-FIELD X-RAY MICROSCOPE—Invited
S.W. Wilkins, D. Gao, T.E. Gureyev, S.C. Mayo, P.R. Miller, Y. Nesterets, D. Parry, A. Pogany,
A.W. Stevenson, CSIRO, Manufacturing & Infrastructure Technology, Clayton, Australia
D. Paganin, CSIRO, Manufacturing & Infrastructure Technology, Clayton, Australia and Monash
University, Clayton, Australia

3:00 D045 SCIENTIFIC APPLICATIONS OF PHASE-CONTRAST DIFFRACTION IMAGING
Y.S. Chu, A. Tkachuk, APS, Argonne National Laboratory, Argonne, IL

3:20 D019 FACTORS AFFECTING IN-LINE PHASE CONTRAST IMAGING WITH A LABORATORY
MICROFOCUS X-RAY SOURCE
K.L. Kelly, B.K. Tanner, University of Durham, Durham, UK

3:40 Break

4:00 C01 TIME-RESOLVED X-RAY IMAGING IN STUDIES OF ADVANCED ALLOY SOLIDIFICATION
PROCESSES—Invited
R.H. Mathiesen, SINTEF Materials and Chemistry, Trondheim, Norway
L. Arnberg, NTNU, Trondheim, Norway

4:30 D004 MICRO X-RAY DIFFRACTION IMAGING OF BULK POLYCRYSTALLINE MATERIALS
T. Wroblewski, HASYLAB, DESY, Hamburg, Germany
A.A. Bjeoumikhov, IFG, Berlin, Germany
B. Hasse, TU Berlin, Berlin, Germany

4:50 D049 LIMITED-PROJECTION TOPOGRAPHY COMPARISON OF TYPES Ib AND IIa DIAMONDS
Y. Zhong, A. Macrander, S. Krasnicki, Y.S. Chu, J. Maj, APS, Argonne National Laboratory,
Argonne, IL

5:10 C08 APPLICATIONS OF POLYCAPILLARY OPTICS IN MEDICAL IMAGING
W.M. Gibson, X-ray Optical Systems, Inc., East Greenbush, NY
C.A. MacDonald, University at Albany SUNY, Albany, NY
2:00  D106  NOVEL ANALYTICAL APPROACHES IN NUMERICAL ANALYSIS OF XRR AND HRXRD DATA FROM THIN FILMS—Invited  
A. Ulyanenkov, Bruker AXS GmbH, Karlsruhe, Germany

2:30  D013  INFLUENCE OF GROWTH INTERRUPTION ON THE FORMATION OF SOLID-STATE INTERFACES  
J. Stümpel, I. Busch, Physikalisch-Technisch Bundesanstalt, Braunschweig, Germany

2:50  D029  HIGH-PRECISION STRAIN DETERMINATION OF SGOI BY HIGH-RESOLUTION IN-PLANE DIFFRACTION  
K. Omote, A. Ogi, Rigaku Corporation, Tokyo, Japan

3:10  D087  IN-SITU AND REAL-TIME CHARACTERIZATION OF MOCVD GROWTH BY X-RAY DIFFRACTION  
A. Kharchenko, J. Bethke, J. Woitok, PANalytical B.V., Almelo, The Netherlands  
K. Lischka, University of Paderborn, Paderborn, Germany  
A. Bonanni, C. Simbrunner, H. Sitter, Johannes Kepler University, Linz, Austria

3:30  Break

4:00  F15  THICKNESS DETERMINATION OF COPPER AND NICKEL NANOLAYERS: COMPARISON OF COMPLETELY REFERENCE-FREE X-RAY FLUORESCENCE ANALYSIS AND X-RAY REFLECTOMETRY  
M. Kolbe, B. Beckhoff, M. Krumrey, G. Ulm, Physikalisch-Technische Bundesanstalt, Berlin, Germany

4:20  F22  MICRO-THIN FILM ANALYSIS USING MONO-CAPILLARY WITH 10-MICROMETER SPATIAL RESOLUTION  
Y. Yokota, K. Obori, S. Komatani, S. Ohawa, HORIBA Ltd., Kyoto, Japan  
A. Whitley, HORIBA Jobin Yvon Inc., Edison, NJ

4:40  D085  SYNCHROTRON X-RAY STUDY OF STRUCTURAL PHASE TRANSFORMATIONS IN CONTINUOUS AND PATTERNED Ge<sub>2</sub>Sb<sub>2</sub>Te<sub>5</sub> PHASE-CHANGE MATERIAL THIN FILMS  
J.L. Jordan-Sweet, S.M. Rossnagel, P.M. Mooney, IBM T.J. Watson Research Center, Yorktown Heights, NY  
S. Raoux, C.T. Rettner, IBM Almaden Research Center, San Jose, CA

5:00  D084  X-RAY AND NEUTRON DIFFRACTION ANALYSIS OF ErD<sub>2</sub> FILMS  
M.A. Rodriguez, J. Browning, C. Frazer, R. Tissot, Sandia National Laboratories, Albuquerque, NM
Wednesday p.m. Session

F-1 Trace Analysis—ppm to ppb

Centennial

Organized by: M.A. Zaitz, IBM, Hopewell Junction, NY

2:00 F70 ULTRA-TRACE ANALYSIS AND SPECIATION BY TXRF-NEXAFS IN THE SOFT X-RAY RANGE—Invited
B. Beckhoff, Physikalisch-Technische Bundesanstalt, Berlin, Germany

2:30 F74 EDXRF WITH HIGH-ENERGY POLARIZED BEAM EXCITATION FOR ANALYSIS OF AEROSOL FILTERS—Invited
R. Van Grieken, Z. Spolnik, K. Van Meel, S. Potgieter-Vermaak, University of Antwerp, Antwerp, Belgium

3:00 F80 STUDY OF TRACE ELEMENTS IN BIOLOGICAL SAMPLES BY EDXRF AND TXRF—Invited
M.L. Carvalho, Universidade de Lisboa, Lisboa, Portugal

3:30 Break

3:50 F03 TXRF ANALYSIS IN THE PPB TO PPM CONCENTRATION RANGE—AN APPLICATIVE STUDY
H. Stosnach, Röntec GmbH, Berlin, Germany

4:10 F50 XRF ANALYSIS AT PPB LEVELS USING DOUBLY CURVED CRYSTAL OPTICS
Z.W. Chen, W.M. Gibson, X-ray Optical Systems, East Greenbush, NY

4:30 F56 TXRF ANALYSIS OF DRINKING WATER AND AUSTRIAN WINE
P. Kregsamer, X. Gruber, P. Wobrauschek, C. Streli, Atomistitut, TU-Wien, Vienna, Austria

4:50 F63 SPECIATION OF NITROGEN COMPOUNDS IN NANOSCOPIC FINE AEROSOL SAMPLES USING TXRF-NEXAFS AND LOW-Z PARTICLE EPMA
J. Osán, S. Török, KFKI Atomic Energy Research Institute, Budapest, Hungary
B. Beckhoff, G. Ulm, Physikalisch-Technische Bundesanstalt, Berlin, Germany
H. Hwang, C.-U. Ro, Inha University, Incheon, Korea
C. Abete, CNR-ICCOM, Pisa, Italy
R. Fuoco, University of Pisa, Pisa, Italy

5:10 F81 SURFACE PROFILE TOTAL REFLECTION X-RAY FLUORESCENCE (SP-TXRF) ANALYSIS FOR CONTAMINATION ON 300mm WAFERS
S. Malloy, M.A. Zaitz, IBM Systems & Technology Group, Hopewell Junction, NY
Thursday a.m. Session
C-4 X-ray Microtomography Applied to Materials Characterization
Gold Camp

Organized by: S. Stock, Northwestern University Medical School, Chicago, IL
R. Barton, Jr., Emeritus, DuPont Experimental Station, Wilmington, DE

8:30 D105 MICROTOMOGRAPHIC IMAGING AND ANALYSIS FOR BASIC RESEARCH—Invited
J.H. Dunsmuir, ExxonMobil Research and Engineering Company, Annandale, NJ

9:00 D100 INDUSTRIAL X-RAY MICROTOMOGRAPHY APPLICATIONS USING A SYNCHROTRON-BASED FACILITY
C.E. Crowder, The Dow Chemical Company, Midland, MI

9:20 C23 VISUALIZATION FOR UNDERSTANDING
H.D. Rosenfeld, DuPont Central Research & Development, Wilmington, DE

9:40 C20 ULTRAFAST X-RADIOGRAPHY AND X-TOMOGRAPHY OF HIGH-PRESSURE AND HIGH-SPEED FUEL SPRAYS—Invited
J. Wang, Argonne National Laboratory, Argonne, IL

10:10 C15 LINEAR ATTENUATION COEFFICIENT QUANTIFICATION WITH CONVENTIONAL X-RAY MICROTOMOGRAPHY: THE QUEST FOR PERFECTION
G.R. Davis, J.C. Elliott, Queen Mary, University of London, London, UK

10:30 Break

10:50 D108 MULTI-MODE X-RAY STUDY OF SULFATE ATTACK OF PORTLAND CEMENT—Invited
K. Kurtis, Georgia Institute of Technology, Atlanta, GA

11:20 D009 COMBINED MICROTOMOGRAPHY AND DIFRACTION ANALYSES OF CREEP PROCESSES
A.R. Pyzalla, H. Kaminski, Technical University Wien, Wien, Austria
W. Reimers, B. Camin, Technical University Berlin, Berlin, Germany
T. Buslaps, M. Di Michiel, ESRF, Grenoble, France

11:40 D103 LABORATORY SYSTEM FOR X-RAY NANOTOMOGRAPHY
A. Sasov, SkyScan, Aartselaar, Belgium

12:00 C12 MICROTOMOGRAPHY OF AMORPHOUS METALLIC FOAM DURING THERMO-PLASTIC EXPANSION
J.C. Hanan, Oklahoma State University, Stillwater, OK
C. Veazey, M.D. Demetriou, California Institute of Technology, Pasadena, CA
F. DeCarlo, Y. Choo, APS, Argonne National Lab, Argonne, IL

12:20 C17 QUANTITATIVE MECHANICAL AND TRANSPORT PROPERTIES OF GRANULAR SYSTEMS CALCULATED FROM X-RAY TOMOGRAPHY IMAGES
9:00  D002  RECIPES FOR THE COLLECTION OF RELIABLE XRD RESIDUAL STRESS DATA—Invited
A.C. Vermeulen, PANalytical, Almelo, The Netherlands

9:30  D071  PLASTIC ANISOTROPY IN HOT EXTRUDED Mg AND BRASS ALLOYS—Invited
W. Reimers, Technical University Berlin, Berlin, Germany

10:00 D066  MEASUREMENT AND MODELING OF INTERNAL STRESSES AT MICROSCOPIC
AND MESOSCOPIC LEVELS USING MICRO RAMAN SPECTROSCOPY AND X-RAY
DIFFRACTION
B. Benedikt, M. Lewis, P. Rangaswamy, Los Alamos National Laboratory, Los Alamos, NM

10:20  Break

10:50 D027  DEPTH RESOLVED STRAIN SCANNING USING HIGH ENERGY SYNCHROTRON
RADIATION AND A CONICAL SLIT CELL
U. Lienert, J.D. Almer, D.R. Haeffner, APS, Argonne National Laboratory, Argonne, IL

11:10 D023  IN-SITU STRAIN AND IMAGING MEASUREMENTS OF SUPERCONDUCTING
Mg/MgB₂ COMPOSITES UNDER COMPRESSIVE LOADING
M.L. Young, J. DeFouw, D.C. Dunand, Northwestern University, Evanston, IL
J.D. Almer, K. Fezzaa, W.-K. Lee, D.R. Haeffner, Argonne National Laboratory, Argonne, IL

11:30 D022  INTERNAL STRAIN MEASUREMENTS IN ULTRAHIGH-Carbon STEELS
M.L. Young, D.C. Dunand, Northwestern University, Evanston, IL
J.D. Almer, U. Lienert, D.R. Haeffner, Argonne National Laboratory, Argonne, IL

11:50 D039  DIFFRACTION INVESTIGATION OF TENSILE LOADING OF CuNb NANO-SCALE
MULTILAYER FILM
Laboratory, Los Alamos, NM
J. Almer, APS, Argonne National Laboratory, Argonne, IL
9:00 D021 DETERMINING SIZE DISTRIBUTION OF SMALL NANOPARTICLES IN HETEROGENEOUS CATALYSTS: CHALLENGES AND OPPORTUNITIES—Invited
J. Liu, Monsanto Company, St. Louis, MO

9:30 D078 AN X-RAY DIFFRACTION INVESTIGATION OF NANOMATERIAL USED IN COMPOSITE CATALYST SYSTEMS—Invited
K. Edwards, K. Sutovich, W.R. Grace, Columbia, MD

10:00 C13 DATA MINING WITH DIFFERENT TYPES OF X-RAY DATA
C.J. Gilmore, University of Glasgow, Glasgow, Scotland, UK
W. Sverdlik, Eastern Michigan University, Ypsilanti, MI

10:20 Break

10:50 D088 THE POWDER DIFFRACTION FILE (PDF): A RELATIONAL DATABASE FOR ELECTRON DIFFRACTION
J. Faber, T. Fawcett, ICDD, Newtown Square, PA
R. Goehner, Sandia National Laboratories, Albuquerque, NM

11:10 D041 POWDER X-RAY DIFFRACTION DETECTION OF CRYSTALLINE PHASES IN AMORPHOUS PHARMACEUTICALS
B.A. Sarsfield, S. Futernik, J.L. Hilden, S. Yin, G. Young, Bristol-Myers Squibb Co., New Brunswick, NJ
J.S. Tan, Purdue University, West Lafayette, IN

11:30 D057 STUDY OF IN SITU HIGH TEMPERATURE DISPLACEMENT REACTIONS VIA X-RAY DIFFRACTION USING A NOVEL GRAPHITE REACTION VESSEL DIATOMS
M.S. Haluska, R.L. Snyder, K. Sandhage, Georgia Institute of Technology, Atlanta, GA

11:50 D030 UNTANGLING CATION ORDERING IN COMPLEX LITHIUM BATTERY CATHODE MATERIALS - SIMULTANEOUS REFINEMENT OF X-RAY, NEUTRON AND RESONANT SCATTERING DATA
P. Whitfield, I. Davidson, National Research Council, Ottawa, Ontario, Canada
L. Cranswick, I. Swainson, Chalk River Laboratories, Chalk River, Ontario, Canada
P. Stephens, State University of New York, Stoney Brook, NY and NSLS, Brookhaven National Laboratory, Upton, NY
9:00  F73  XRF ANALYSIS OF COMPLEX MATERIALS; OPTIMIZING THE TECHNIQUE—Invited
T. Ahmedali, McGill University, Montreal, Canada

9:30  F75  THE FUSION METHOD APPLIED TO A WIDE VARIETY OF INDUSTRIAL
APPLICATIONS—Invited
K.F. Maley, SGS Lakefield Research, Ontario, Canada

10:00 F31  BORATE FUSIONS AND CEMQUANT—TWO COMPLEMENTARY MEANS FOR ACCURATE
MINERALOGICAL ANALYSIS OF PORTLAND CEMENT
J.-P. Gagnon, Corporation Scientifique Claisse Inc., Sainte-Foy (Quebec), Canada

10:20  Break

10:50 F62  AN IMPROVED ANALYTICAL METHODOLOGY USING SYNTHETIC STANDARDS,
FUSED BEADS AND X-RAY FLUORESCENCE SPECTROMETRY FOR CEMENTS AND
ASSOCIATED MATERIALS
M.N. Ingham, N.D. Eatherington, C.J.B. Gowing, British Geological Survey, Nottingham,
United Kingdom

11:10 F02  NEW OBSERVATIONS ON LiBr RELEASING AGENT LAYER IN FUSION BEADS
F. Claisse, Fernand Claisse Inc., Sainte-Foy (Quebec), Canada

11:30 F04  COMPARISON OF FUSION VERSUS PRESSED POWDER IN XRF ANALYSIS
J.E. Martin, Spex Sample Prep LLC, Metuchen, NJ
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<td>2:00</td>
<td>D061</td>
<td>APPLICATIONS OF X-RAY MICRODIFFRACTION IN THE IMAGING INDUSTRY—Invited</td>
<td>T.N. Blanton, Eastman Kodak Company, Rochester, NY</td>
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<td>2:30</td>
<td>F24</td>
<td>DETECTION OF VISIBLE AND LATENT FINGERPRINTS BY MICRO-X-RAY FLUORESCENCE</td>
<td>C.G. Worley, S.S. Wiltshire, T.C. Miller, G.J. Havrilla, V. Majidi, Los Alamos National Laboratory, Los Alamos, NM</td>
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<td>3:10</td>
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<td>Break</td>
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<td>3:40</td>
<td>D054</td>
<td>STRUCTURAL CHARACTERIZATION OF PENTAGON-SHAPED LEAD MESOSCOPIC PARTICLES BY X-RAY MICRODIFFRACTION</td>
<td>Y. Xiao, Z. Cai, Y.S. Chu, A. Tkachuk, APS, Argonne National Laboratory, Argonne, IL</td>
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<td>4:00</td>
<td>D005</td>
<td>MICRO AND MESO-SCALE STRAIN MEASUREMENTS IN CEMENT-BASED MATERIALS</td>
<td>J.J. Biernacki, C.J. Parnham, Tennessee Technical University, Cookeville, TN</td>
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<td>C.R. Hubbard, T.R. Watkins, Oak Ridge National Laboratory, Oak Ridge, TN</td>
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<td>J. Bai, University of Tennessee, Knoxville, TN</td>
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<td>4:20</td>
<td>D044</td>
<td>MICROBEAM X-RAY STRAIN FROM MATRIX GRAINS AND FIBER OF SIMILAR SCALE IN A TENSILE STRESSED COMPOSITE</td>
<td>H.A. Bale, J.C. Hanan, Oklahoma State University, Stillwater, OK</td>
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<td>N. Tamura, Advanced Light Source, Lawrence Berkeley National Lab, Berkeley, CA</td>
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<td>R. Rogan, E. Ustundag, Iowa State University, Ames, IA</td>
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<td>4:40</td>
<td>D070</td>
<td>APPLICATION OF X-RAY MICRODIFFRACTION TO ANALYZE NANOCRYSTALS EMBEDDED IN NANOPOROUS MATRICES</td>
<td>J.-M. Ha, M.A. Hillmyer, M.D. Ward, University of Minnesota, Minneapolis, MN</td>
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2:00  D067  A STUDY ON THE RELATIONSHIP BETWEEN CRYSTAL ORIENTATION AND ETCHING PROPERTIES OF PATTERNED Cu ON PCB
Y.-I. Jang, B.-K. Kim, J.-S. Kim, Samsung Electro-Mechanics, Suwon, Korea

2:20  D101  FORMULATION ANALYSES OF COMMERCIAL MATERIALS
T.G. Fawcett, J. Faber, F. Needham, ICDD, Newtown Square, PA
C.R. Hubbard, Oak Ridge National Laboratory, Oak Ridge, TN
J.A. Kaduk, BP Chemicals, Naperville, IL

2:40  F76  THE USE OF X-RAY INSTRUMENTATION FOR QUALITY CONTROL IN A CEMENT PLANT—Invited
B.E. Rowe, C.R. Urrutia, Holcim, Clarksville, MO

3:10  Break

3:30  C21  PRACTICAL APPLICATIONS OF NEW GENERATION XRF-XRD INSTRUMENTS IN CEMENT PROCESS CONTROL SYSTEMS—Invited
S.B. Feldman, A. van Eenbergen, S. Williams, PANalytical, Inc., Natick, MA

4:00  D037  QUANTITATIVE RIETVELD ANALYSIS OF HYDRATED CEMENTITIOUS SYSTEMS
L. Mitchell, P. Whitfield, National Research Council, Ottawa, Ontario, Canada

4:20  F44  ALLOY CHARACTERIZATION AND IDENTIFICATION USING THE RUBBING TECHNIQUE WITH MICRO X-RAY FLUORESCENCE
V. Montoya, G.J. Havrilla, Los Alamos National Laboratory, Los Alamos, NM

4:40  F45  QUANTITATIVE ANALYSIS OF TITANIUM-RICH ORES BY X-RAY FLUORESCENCE
W.W. Brubaker, R.M. Martin, DuPont Central Research and Development, Wilmington, DE
M.H. Headinger, T. Segers, A. Wall, DuPont Titanium Technologies, Starke, FL
Thursday p.m. Session

D-3 Line Profile Analysis

Gold Camp

Organized by: R.L. Snyder, Georgia Institute of Technology, Atlanta, GA
J.A. Kaduk, BP Chemicals, Naperville, IL

1:30 D051 OBTAINING RELIABLE RESULTS BY LINE BROADENING ANALYSIS—Invited
D. Balzar, University of Denver, Denver, CO

2:00 D089 X-RAY LINE PROFILE ANALYSIS FOR MICROSTRUCTURAL CHARACTERIZATION OF NANOMATERIALS—Invited
I. Dragomir-Cernatescu, Georgia Institute of Technology, Atlanta, GA

2:30 D036 INVESTIGATING THE NATURE OF LINE BROADENING IN ELECTROCHEMICALLY DEINTERCALATED Li$_{1.2}$Mn$_{0.4}$Ni$_{0.3}$Co$_{0.1}$O$_2$
P. Whitfield, S. Niketic, Y. Le Page, I. Davidson, National Research Council, Ottawa, Ontario, Canada

2:50 D048 ANALYSIS OF TEXTURE AND DIFFRACTION DATA FROM STRONG NEUTRON ABSORBERS
L. Lutterotti, University of Trento, Trento, Italy
J. Pehl, University of California, Berkeley, CA

3:10 Break

3:40 D053 CRYSTALLOGRAPHIC CHANGES IN ELECTRICALLY FATIGUED PZT ACTUATORS
J. Müller, S. Hooker, NIST, Boulder, CO
D. Balzar, NIST, Boulder, CO and University of Denver, Denver, CO

4:00 D090 SRM 1979: A NIST SRM FOR NANO-CRYSTALLITE SIZE BROADENING—Invited
N. Armstrong, University of Technology Sydney, Sydney, Australia and NIST, Gaithersburg, MD
J.P. Cline, J. Ritter, J. Bonevich, NIST, Gaithersburg, MD

4:30 D003 CLOSE CONTACT PENALTY FUNCTIONS IN DIRECT SPACE METHODS AND ENERGETIC CONSIDERATIONS IN STRUCTURE REFINEMENT
C. Liang, Accelrys Software, Inc., San Diego, CA

4:50 D095 MALACHITE-ROSASITE GROUP: EVIDENCE FOR TWO DISTINCT STRUCTURAL TYPES THROUGH RIETVELD REFINEMENTS
N. Perchiazzi, S. Merlino, Università di Pisa, Pisa, Italy
Thursday p.m. Session

F-3 Quantitative XRF

Centennial

Organized by: J. Gilfrich, Emeritus, SFA, Inc./NRL, Bethesda, MD

Co-chair: W.T. Elam, EDAX, Mahwah, NJ and University of Washington, Seattle, WA

1:30 C11 STANDARDLESS XRF—Invited
M. Mantler, Vienna University of Technology, Vienna, Austria

2:00 F67 OPTIMIZATION OF QUANTIFICATION SCHEMES FOR CONTEMPORARY FIELD-PORTABLE XRF ANALYZERS—Invited
S. Piorek, Niton LLC, Billerica, MA

2:30 F01 USE OF THE MONTE CARLO SIMULATION CODE CEARXRF FOR THE EDXRF INVERSE PROBLEM
W. Guo, R.P. Gardner, F. Li, North Carolina State University, Raleigh, NC

2:50 F13 FUNDAMENTAL PARAMETER METHOD USING SCATTERING X-RAYS IN X-RAY FLUORESCENCE ANALYSIS
Y. Kataoka, N. Kawahara, S. Hara, Y. Yamada, T. Matsuo, Rigaku Industrial Corporation, Osaka, Japan
M. Mantler, Vienna University of Technology, Vienna, Austria

3:10 Break

3:30 F41 FULL SPECTRUM CALCULATIONS OF EDXRF SPECTRA
W.T. Elam, B. Shen, B. Scruggs, J. Nicolosi, EDAX, Inc., Mahwah, NJ

3:50 F48 MATRIX CORRECTION FOR TRACE ELEMENT ANALYSIS USING MASS ATTENUATION COEFFICIENTS
B. Vrebos, S. Milner, PANalytical, Almelo, The Netherlands
M. Ingham, British Geological Survey, Keyworth, UK

4:10 F07 A NEW APPROACH FOR QUANTITATIVE ANALYSIS IN EDXRF USING SILICON DRIFT DETECTORS
J. Heckel, SPECTRO A.I., Kleve, Germany

4:30 F16 NANOLITER DRIED SPOT DEPOSITION USING AN AUTOMATED DISPENSER FOR MXRF QUANTITATIVE ANALYSES
E.P. Hastings, T. Miller, G.J. Havrilla, Los Alamos National Laboratory, Los Alamos, NM

4:50 F60 QUANTITATIVE X-RAY FLUORESCENCE ANALYSIS FOR THICK SAMPLE BY FUNDAMENTAL PARAMETERS
Y. Xiao, APS, Argonne National Laboratory, Argonne, IL
Friday a.m. Session

C-7 X-ray Optics

Pikes Peak 1&2

Organized by: G.J. Havrilla, Los Alamos National Laboratory, Los Alamos, NM

8:30  D092  APPLICATIONS OF PARALLEL BEAM OPTICS AT ELEVATED TEMPERATURES—Invited
      T.R. Watkins, Oak Ridge National Laboratory, Oak Ridge, TN

9:00  F35  TOWARDS THREE-DIMENSIONAL TRACE ELEMENT MICROSCOPIC XRF ANALYSIS—Invited
       B. Vekemans, K. Janssens, University of Antwerp, Wilrijk, Belgium
       L. Vincze, Ghent University, Ghent, Belgium

9:30  F27  CONFOCAL MICRO X-RAY FLUORESCENCE MICROSCOPE: PERFORMANCE CAPABILITIES
       E.P. Hastings, G.J. Havrilla, Los Alamos National Laboratory, Los Alamos, NM

9:50  F51  COMPARISON OF X-RAY BEAM FORMING OPTICS FOR MICRO X-RAY FLUORESCENCE
       G.J. Havrilla, E.P. Hastings, B. Patterson, V. Montoya, Los Alamos National Laboratory,
       Los Alamos, NM

10:10 Break

10:30  F29  NANOMETER MULTILAYERS AS MONOCHROMATORS FOR THE X-RAY FLUORESCENCE
       ANALYSIS
       S. Braun, T. Foltyn, W. Friedrich, A. Leson, IWS Dresden, Fraunhofer Institute for Material and
       Beam Technology, Dresden, Germany
       R. Dietsch, D. Weiβbach, AXO DRESDEN GmbH, Dresden, Germany

10:50  D093  XRD DATA QUALITY—ABOUT THE ART TO CONFIGURE THE OPTIMUM DIFFRACTION SYSTEM
       L. Brügemann, A. Kern, H.-G. Krane, O. Bahr, Bruker AXS GmbH, Karlsruhe, Germany

11:10  D073  CALCULATING SAMPLE DISPLACEMENT FROM PATTERNS WITH DIFFERENT FIXED INCIDENT ANGLES
       J.M. Neil, A. Navrotsky, University of California at Davis, Davis, CA
       H. Pilliere, Inel, Artenay, France
9:00  D072  A NEW AREA DETECTOR FOR HIGH-SPEED AND HIGH-SENSITIVITY X-RAY DIFFRACTION ANALYSIS—Invited
T. Taguchi, Rigaku Corporation, Tokyo, Japan

9:30  D094  DETECTORS FOR X-RAY DIFFRACTION AND SCATTERING: CURRENT STATUS AND FUTURE CHALLENGES
L. Brügemann, E. Gerndt, A. Kern, H.-G. Krane, Bruker AXS GmbH, Karlsruhe, Germany
Y. Diawara, B. He, Bruker AXS, Inc., Madison, WI

9:50  F38  SILICON MULTI-CATHODE DETECTOR (SMCD) DEVELOPMENTS FOR HIGH-SPEED XRF ANALYSIS
S. Barkan, J.S. Iwanczyk, V.D. Saveliev, C.R. Tull, L. Feng, B.E. Patt, Radiant Detector Technologies, Northridge, CA

10:10  Break

10:30  F25  OPTIMIZED READOUT METHODS OF SILICON DRIFT DETECTORS FOR HIGH RESOLUTION, HIGH COUNT RATE X-RAY SPECTROSCOPY
A. Niculae, H. Soltau, P. Lechner, PNSensor GmbH, Munich, Germany
G. Lutz, L. Strüder, MPI Halbleiterlabor, Munich, Germany
C. Fiorini, A. Longoni, Politecnico di Milano, Milano, Italy

10:50  F26  LARGE AREA SILICON DRIFT DETECTORS FOR X-RAY SPECTROSCOPY
A. Niculae, H. Soltau, P. Lechner, R. Eckhard, PNSensor GmbH, Munich, Germany
G. Lutz, L. Strüder, G. Schaller, F. Schopper, MPI Halbleiterlabor, Munich, Germany
C. Fiorini, A. Longoni, Politecnico di Milano, Milano, Italy

11:10  C04  100 mm² SILICON DRIFT DETECTORS WITH DISCRETE FIRST FET
P. Goldstrass, J. Kemmer, O. Boslau, T. Eggert, A. Pahlke, F. Wiest, KETEK GmbH, Munich, Germany
8:30 F42 QUANTITATIVE ENERGY-DISPERSIVE ELECTRON PROBE X-RAY MICROANALYSIS OF INDIVIDUAL PARTICLES—Invited
C.-U. Ro, Inha University, Incheon, Korea

9:00 F30 MICRO-XRF ANALYSIS OF BIOLOGICAL MATERIALS—Invited
K. Tsuji, K. Nakano, Osaka City University, Osaka, Japan and PRESTO, JST, Saitama, Japan
K. Tanaka, A. Okhrimovskyy, Y. Konishi, Osaka City University, Osaka, Japan
X. Ding, Beijing Normal University, Beijing, China

9:30 F64 ENERGY DISPERSIVE X-RAY MICROANALYSIS OF HOT PARTICLES—Invited
S. Török, A. Alsecz, J. Osán, KFKI Atomic Energy Research Institute, Budapest, Hungary
N. Vajda, Budapest University of Technology and Economics, Budapest, Hungary

10:00 Break

10:20 F18 MICRO X-RAY FLUORESCENCE AS A HIGH THROUGHPUT, DOUBLE COMBINATORIAL SCREENING TOOL
E.M. Minogue, T.P. Taylor, G.J. Havrilla, Los Alamos National Laboratory, Los Alamos, NM

10:40 F21 ABNORMAL X-RAY EMISSION FROM INSULATORS BOMBARDED WITH LOW ENERGY IONS
M. Song, K. Mitsuishi, M. Takeguchi, K. Furuya, National Institute for Materials Science, Tsukuba, Ibaraki, Japan
R.C. Birtcher, Argonne National Laboratory, Argonne, IL

11:00 F37 A COMPARISON OF EDXRF AND RAMAN CHEMICAL IMAGING FOR USE IN FORMULATION PROCESS DEVELOPMENT AND QUALITY CONTROL
A. Whitley, S. Mamedov, F. Adar, Horiba Jobin Yvon, Inc., Edison, NJ
F. Clarke, Pfizer, UK

11:20 F39 TOTAL EDXRF ASSAY OF PLASTICS EXPLOITING NON-SHERMAN VOLUMETRIC EFFECTS
A.J.-C. Lee, P.J. Ramadge, Princeton University, Princeton, NJ
B. Hubbard-Nelson, Innov-X Systems, Inc., Woburn, MA
D.I. Feinstein, Analytic Animations, Portland, OR

11:40 F54 NONDESTRUCTIVE ANALYSIS OF INDIVIDUAL FLUID INCLUSION BY SRXRF
Y. Huang, W. He, Chinese Academy of Sciences, Beijing, China
C. Wu, K. Li, Yangtze University, Hubei, China
Area Attractions

Garden of the Gods - 719-385-5940
West on Circle Blvd., right (North) on I-25 to exit Highway 24 West. Right (North) on 31st St., left (West) on Colorado Ave., right (North) on Beckers Lane to the Trading Post. Approx. 15 min.

Seven Falls - 719-632-0765
West on Circle Blvd., which turns into Lake Avenue. Continue on Lake until veering to the right at The Broadmoor. Left on Mesa Road. Follow signs to Seven Falls entrance. Approx. 15 min.

Air Force Academy - 719-333-7731
West on Circle Blvd., right (North) on I-25 to exit #156B left (West). Follow signs. Approx. 25 min.

US Olympic Training Center - 719-578-4618
West on Circle Blvd., right (North) on I-25 to exit Highway 24 East. Take next exit, Union Blvd., go left (North) to Boulder Street & turn left. Entrance is on the right. Approx. 10 min.

Pikes Peak - (Gray Line Tours - 719-633-1181)
Use directions (below) to North Pole. $10.00 each or $35.00/car. Under age 16 - free. Approx. 30 min.

Peterson AFB - 719-556-7321
West on Circle Blvd., right (North) on I-25 to exit Highway 24 East, which turns into Fountain Blvd. Take to Powers Blvd., left (North) to Platte Ave. exit (Hwy 24). right (East) to Peterson Road, right (South) to gate. Approx. 20 min.

Cave of the Winds - 719-685-5444
West on Circle Blvd., right (North) on I-25 to exit Highway 24 West. Pass over the Town of Manitou & take Cave of the Winds exit on right. Approx. 20 min.

Royal Gorge Bridge - 719-275-7507 or 888-333-5597
West on Circle Blvd., which turns into Lake Avenue. Left (South) on Highway 115 (Nevada Avenue), right (West) on Highway 50. Continue through Canon City. Follow signs. Approx. 1 hour.

North Pole and Santa's Workshop - 719-684-9432
West on Circle Blvd., right (North) on I-25 to exit Highway 24 West. Continue on Hwy 24 into foothills. Watch for Pikes Peak Tollway sign - exit on left (just after overhead bridge). Follow signs. Approx. 30 min.

Cheyenne Mountain Zoo - 719-633-9925
West on Circle Blvd., which turns into Lake Avenue. Continue on Lake until veering to the right at The Broadmoor. Take left onto Cresta Road. Follow signs. Approx. 12 min.

Cripple Creek - 877-858-GOLD (4653)
West on Circle Blvd., right (North) on I-25 to exit Highway 24 West. Continue on Hwy 24 to Town of Divide, left at Cripple Creek/Victor sign. Approx 1 1/2 hour.

Cog Railway - 719-685-5401
West on Circle Blvd., right (North) on I-25 to Highway 24 West. Take Manitou exit, go West through the Town of Manitou then left on Ruxton Ave. to Cog Depot. Approx. 20 min.

Manitou Cliff Dwellings - 719-685-5242 or 800-354-9971
West on Circle Blvd., right (North) on I-25 to Highway 24 West exit. Pass over the Town of Manitou & take Cliff Dwellings exit on right. Approx. 20 min.

Pro Rodeo Hall of Fame and American Cowboy Museum - 719-528-4764
West on Circle Blvd., right (North) on I-25 to exit #147 (Rockrimmon). Left on Pro Rodeo Dr. Approx. 15 min.

Flying W Ranch - 800-232-FLYW (3599)
West on Circle Blvd., right (North) on I-25 to exit #146 (Garden of the Gods Road) West until it ends. Right (North) on 30th Street, next left (only way) on Flying W Ranch Road, left on Chuckwagon to parking lot. Approx. 25 min.

Miramont Castle - 719-685-1011
West on Circle Blvd., right (North) on I-25 to Highway 24 West. Take Manitou exit, go West through the Town of Manitou then left on Ruxton Ave. Visible from Ruxton - turn right on Capitol. Approx. 20 min.

Shopping - Manitou Springs, Old Colorado City, Downtown Colorado Springs, Citadel Mall and Chapel Hills Mall.
From West
Take Highway 24 East to I-25 South. On I-25 South, take Exit 138 (Circle Drive). Turn right at light. The hotel is on the left side of I-25 and clearly visible from the highway.

From North
Take Interstate 25 South to Exit 138 (Circle Drive). The hotel is on east side of I-25 and clearly visible from the highway.

From South
Take I-25 North to Exit 138 (Circle Drive). Turn right at the light. The hotel is on the right side of I-25 and clearly visible from the highway.

From Colorado Springs Municipal Airport
Take Drennan for 2 miles. Turn right onto Hancock for 4 miles. Turn right onto South Circle Drive for 1 mile. The hotel is on the right side of South Circle Drive.

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Sheraton Colorado Springs
Hotel Layout

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<td>Mon. am: Workshops</td>
<td>XRD Application I – Beginner (Kern/Faber) Pikes Peak 1 &amp; 2</td>
<td>W1 Rietveld Applications I – Beginner (Kern/Faber) Pikes Peak 1 &amp; 2</td>
<td>W3 Specimen Preparation I (Anzelmo/Broton) Centennial</td>
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<td>XRD Application II – Advanced (Kern/Faber) Pikes Peak 1 &amp; 2</td>
<td>W2 Two-dimensional X-ray Diffraction (Blanton/He) Pikes Peak 3 &amp; 4</td>
<td>W5 Specimen Preparation II (Anzelmo/Broton) Centennial</td>
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<tr>
<td>Mon. pm: Workshops</td>
<td>W7 X-ray Microtomography (Stock) Pikes Peak 1 &amp; 2</td>
<td>W4 Rietveld Applications II – Advanced (Kern/Faber) Pikes Peak 1 &amp; 2</td>
<td>W6 Monte Carlo Techniques in XRF (Gardner) Pikes Peak 3 &amp; 4</td>
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<td>W11 X-ray Optics (Havrilla) Pikes Peak 1 &amp; 2</td>
<td>W8 Diffraction Analysis of Stress &amp; Strain (Noyan) Pikes Peak 3 &amp; 4</td>
<td>W9 Quantitative XRF I (Mantler) Gold Camp</td>
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<td>W12 Line Profile Analysis by the Whole Powder Pattern Fitting (Balzar) Pikes Peak 3 &amp; 4</td>
<td>W10 Basic XRF (Creasy) Centennial</td>
<td>W13 Quantitative XRF II (Mantler) Gold Camp</td>
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<td>W14 Energy Dispersive XRF (Zaitz/Anzelmo) Centennial</td>
<td>W15 Energy Dispersive XRF (Zaitz/Anzelmo) Centennial</td>
<td>W14 Energy Dispersive XRF (Zaitz/Anzelmo) Centennial</td>
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**Denver X-ray Conference Program-at-a-Glance**
1-5 August 2005

Sun. eve.: 6:00 – 8:00 Welcoming Reception sponsored by Corporation Scientifique Claisse, Moxtek, Shimadzu/Kratos & Wiley - Summit Ballroom

Mon. eve.: 6:00 – 8:00 Evening Reception sponsored by PANalytical; XRD I Poster Session (Snyder/Misture) Summit Ballroom

Tue. am: Workshops 9:00 – 12:00

Wed. am: 8:30 Plenary Session: X-ray Imaging (Barton/Stock) Summit Ballroom

Wed. pm: Sessions*

<table>
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<tr>
<th>XRD &amp; XRF</th>
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<tbody>
<tr>
<td>C-1 New Developments in XRD &amp; XRF Instrumentation (Anzelmo) Pikes Peak 1 &amp; 2</td>
<td>W7 X-ray Microtomography (Stock) Pikes Peak 1 &amp; 2</td>
<td>W3 Specimen Preparation I (Anzelmo/Broton) Centennial</td>
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<tr>
<td>C-2 Advanced Imaging Techniques (Snigirev/Wilkins) Gold Camp</td>
<td>W4 Rietveld Applications II – Advanced (Kern/Faber) Pikes Peak 1 &amp; 2</td>
<td>W5 Specimen Preparation II (Anzelmo/Broton) Centennial</td>
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<tr>
<td>C-3 Thin Films (Huang/Toraya) Pikes Peak 3 &amp; 4</td>
<td>W8 Diffraction Analysis of Stress &amp; Strain (Noyan) Pikes Peak 3 &amp; 4</td>
<td>W6 Monte Carlo Techniques in XRF (Gardner) Pikes Peak 3 &amp; 4</td>
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Wed. eve: 6:00 – 8:00 Evening Reception sponsored by MDI & Rigaku; XRD II Poster Session (Huang/Kaduk) Summit Ballroom

Thurs. am: Sessions*

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<tr>
<td>C-4 X-ray Microtomography Applied to Materials Characterization (Stock/Barton) Gold Camp</td>
<td>W8 Diffraction Analysis of Stress &amp; Strain (Noyan) Pikes Peak 3 &amp; 4</td>
<td>W9 Quantitative XRF I (Mantler) Gold Camp</td>
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<td>D-1 Stress Analysis (Goldsmith/Watkins) Pikes Peak 1 &amp; 2</td>
<td>W4 Rietveld Applications II – Advanced (Kern/Faber) Pikes Peak 1 &amp; 2</td>
<td>W5 Specimen Preparation II (Anzelmo/Broton) Centennial</td>
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<tr>
<td>D-2 Industrial Applications of XRD (Snyder/Paziant) Pikes Peak 3 &amp; 4</td>
<td>W8 Diffraction Analysis of Stress &amp; Strain (Noyan) Pikes Peak 3 &amp; 4</td>
<td>W6 Monte Carlo Techniques in XRF (Gardner) Pikes Peak 3 &amp; 4</td>
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<tr>
<td>F-1 Trace Analysis – ppm to ppb (Zaitz) Centennial</td>
<td>W5 Specimen Preparation II (Anzelmo/Broton) Centennial</td>
<td>W7 X-ray Microtomography (Stock) Pikes Peak 1 &amp; 2</td>
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<td>C-5 Microbeam Analysis (Buhreke) Pikes Peak 1 &amp; 2</td>
<td>W8 Diffraction Analysis of Stress &amp; Strain (Noyan) Pikes Peak 3 &amp; 4</td>
<td>W9 Quantitative XRF I (Mantler) Gold Camp</td>
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<td>C-6 Industrial Applications of XRD &amp; XRF (Paziant/Broton) Pikes Peak 3 &amp; 4</td>
<td>W4 Rietveld Applications II – Advanced (Kern/Faber) Pikes Peak 1 &amp; 2</td>
<td>W5 Specimen Preparation II (Anzelmo/Broton) Centennial</td>
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<td>D-3 Line Profile Analysis (Snyder/Kaduk) Gold Camp</td>
<td>W8 Diffraction Analysis of Stress &amp; Strain (Noyan) Pikes Peak 3 &amp; 4</td>
<td>W6 Monte Carlo Techniques in XRF (Gardner) Pikes Peak 3 &amp; 4</td>
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<td>F-3 Quantitative XRF (Gilfrich/Elam) Centennial</td>
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<td>W7 X-ray Microtomography (Stock) Pikes Peak 1 &amp; 2</td>
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Fri. am: Sessions*

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<td>C-7 X-ray Optics (Havrilla) Pikes Peak 1 &amp; 2</td>
<td>W8 Diffraction Analysis of Stress &amp; Strain (Noyan) Pikes Peak 3 &amp; 4</td>
<td>W9 Quantitative XRF I (Mantler) Gold Camp</td>
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<td>C-8 Detectors &amp; Sources (Huang) Pikes Peak 3 &amp; 4</td>
<td>W4 Rietveld Applications II – Advanced (Kern/Faber) Pikes Peak 1 &amp; 2</td>
<td>W5 Specimen Preparation II (Anzelmo/Broton) Centennial</td>
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<td>F-4 Energy Dispersive Applications (Van Grieken) Centennial</td>
<td>W8 Diffraction Analysis of Stress &amp; Strain (Noyan) Pikes Peak 3 &amp; 4</td>
<td>W6 Monte Carlo Techniques in XRF (Gardner) Pikes Peak 3 &amp; 4</td>
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*Session times vary; please consult the Program for exact presentation times.
RESERVATION REQUEST FOR AIR TRAVEL
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SPONSORED BY
INTERNATIONAL CENTRE FOR DIFFRACTION DATA
COLORADO SPRINGS
1 TO 5 AUGUST 2005

Travelers Name:__________________________________________________________.

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2005 Denver X-ray Conference Registration Form
Sheraton Colorado Springs, Colorado Springs, Colorado, U.S.A.
1–5 August 2005

PLEASE TYPE to avoid errors on name tags and attendee list. On-line registration is also available at: www.dxcicdd.com

First Name ____________________________________ Last Name ______________________________________
Organization _________________________________________________________________________________
Address ______________________________________________________________________________________
City ________________________ State ________________ Zip ______________ Country___________________
Phone ______________________ Fax _________________________ E-mail ______________________________

❑ Check this box if you Do Not want your name included on the attendee list

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<tr>
<th>Registration Fees: Discount fees will only apply if registration form and payment are received by 5 July</th>
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<tr>
<td>Full week: exhibits, workshops, sessions†</td>
<td>$400</td>
<td>$475</td>
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<td>Monday &amp; Tuesday: exhibits, workshops†</td>
<td>$350</td>
<td>$425</td>
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<tr>
<td>Wed., Thurs. &amp; Friday: exhibits, sessions†</td>
<td>$350</td>
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<tr>
<td>Session organizer, invited speaker &amp; workshop instructor†</td>
<td>$100</td>
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<tr>
<td>(Circle one) Student (I.D. required), unemployed, 65 and older</td>
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<td>Exhibits only</td>
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†Includes a copy of Volume 49 of Advances in X-ray Analysis on CD-ROM
‡Students, unemployed and over 65 must have their status confirmed by the Conference Coordinator (see information at bottom of page).

Please take this opportunity to purchase other ICDD Products:

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❑ I will pick up my AXA CD(s) at the conference, and avoid paying the shipping fee.

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❑ Single Volume 40, 41, 42, 43, 44, 45, 46, 47 or 48 [please circle selection(s)] $160 each

Powder Diffraction‡

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Student pricing

Please take further information regarding Powder Diffraction on page 2 of this program.

Payment:
Total Amount Due: _______________________
❑ Check enclosed for _____________________ made payable to ICDD/DXC
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Please take the time to answer the following questions:

Are you primarily interested in XRD or XRF topics?
❑ XRD ❑ XRF ❑ Equally interested in both

If registering for workshops, please circle the workshops you plan to attend please refer to Conference Program for explanation of codes):
W1    W2    W3    W4    W5    W6    W7    W8    W9    W10    W11    W12    W13    W14

To Submit Registration form:
Mail: ICDD, Denise Flaherty, 12 Campus Boulevard, Newtown Square, PA 19073-3273, U.S.A.
Fax: 610.325.9823

Cancellation Policy: Cancellations must be submitted in writing to Denise Flaherty. A full refund will be issued, less a $50 processing fee, if the cancellation is received at least two weeks before the conference (Monday, 18 July 2005). No refunds will be issued for cancellations received after 18 July 2005.

Please contact Denise Flaherty for any additional information, E-mail flaherty@icdd.com or Phone 610.325.9814