

rounding its origin. Clearly the commercial software must address the issues of system compatibility in a manner somewhat different from that of freely circulated programs. For \$500 I should expect significantly greater attention to details associated with the system environment and significant "customer service" in the implementation of the program on my system. With a diskette distributed at the cost of postage and handling, I might expect to marshal my own

resources to a greater, sometimes exclusive, extent. As you become more comfortable with your PC, I might expect you to try incorporating custom enhancements to improve the presentation of information and/or to provide additional results.

¹Garvey, R. *Powder Diffraction* 1986 1 (1) 114.

***Trademark of MicroSoft Corporation.

Commercial Announcements

STEREOPLot

STEREOPLot is a user friendly program which provides stereographic projections of all crystal systems using an algorithm based on the equations from Cullity. Either plane or direction can be specified. The 100, 110, and 111 type poles are displayed on the screen along with any additional set input by the user. The locations of the major poles are color coded. Miller-Bravais indices are used for hexagonal crystals. Stereographic projections up to 6.4 inches in diameter can be plotted using an EPSON compatible dot matrix printer.

Equipment: STEREOPLot runs on the IBM-PC and compatible personal computers with at least 256K memory and a color graphics card. Best results are obtained with a color monitor. To print the pattern, an IBM EPSON or compatible dot matrix printer is required.

Scientific Software Services, 3497 School Road, Murrysville, PA 15668 (412) 327-2354.

Subprogram Library for PASCAL Users

For the PASCAL user, 363 procedures are available as a Subprogram Library consisting of five volumes: Mathematics, Statistics, Spectroscopy/Chromatography, and for the IBM-PC and compatibles, Graphics and Utilities. This is suggested to be the most comprehensive collection of PASCAL procedures designed specifically for laboratory applications. The Library comes as source code compatible with most compilers.

Scientific Logics, Inc., Box 3025, Stanford, California 94305, U.S.A. (408) 446-3575.

Residual Stress Analysis Now Available For The Factory Floor

Premature failures in metallic components, such as fatigue or stress corrosion cracking, can be caused by lack of control over residual stresses and retained austenite content during the component manufacturing process. Technology for Energy Corporation's new 1600 Series X-Ray Residual Stress Analysis Systems provides a non-destructive means to monitor production of components, including those of large size or irregular shape, that previously could not be analyzed. Valuable insight into quality control, process control, and failure analysis can be provided by the TEC systems in a wide variety of metal forming, treating, and joining operations.

The applications and features of the TEC 1600 systems that can help you improve the quality, yield, and reliability of your metallic components are described in a six-page brochure. To obtain the brochure or for additional information, contact Robert F. Hill at Technology for Energy Corporation, Knoxville, Tennessee (615) 966-5856 or TEC's exclusive U.S. sales representative:

Ridge, Inc.
4432 Bibb Boulevard
Tucker, Georgia 30094
Telephone: (404) 939-1554
Telex: 810-766-4919

IC Laboratories Expands X-Ray Diffraction Thru-Put Capacity

IC Laboratories, the X-ray analytical services division of Intelligent Controls, Inc. has expanded its X-ray diffraction sample thru-put capacity by the addition of a second computer-automated powder diffractometer. Powder diffraction is used to identify and characterize materials for such industries as coal, oil, mining, catalyst, metals, ceramics, semiconductor, cement, chemical, environmental, and others.

"Our new equipment is aimed at improving response time for customers with large sample volume in routine applications", says Walter Schreiner, one of the founders of the laboratory. He adds that computerized data collection and analysis improves accuracy and repeatability because corrections for systematic errors are carried out automatically by the software.

IC Laboratories specializes in X-ray diffraction applications such as the identification of unknown materials, crystallite size analysis for catalysts, magnetic recording media, and fibres, NIOSH tests for respirable quartz, the determination of mineral content in coals, QC of ceramics and metals, etc. Special emphasis is placed on assisting commercial and in-house diffraction laboratories handle sample backlogs and peak loads. Data can be collected and transmitted to the customers remote computer for processing, or analysis may be carried out at IC Laboratories.

The firm, which has serviced the non-destructive testing market since 1981, has extensive experience in X-ray diffraction applications; staff members are responsible for numerous publications in the field. Samples are usually sent by mail or UPS, and results are returned in 3-5 days. The company may be contacted at (914) 962-2477, or inquiries may be directed to P.O. Box 721, Amawalk, NY 10501.

Contact: Walter N. Schreiner, Ph.D.
IC Laboratories
(914) 962-2477

Wafer-Mapping System

A new brochure from SPEX Industries, Inc. describes a photoluminescence system that delivers a point-by-point map of semiconductor wafers that are up to 3-inches in diameter. A unique optical-scanning system guides the laser excitation over the wafer's surface and collects the resulting photoluminescence which is analyzed by a high performance spectrometer. From these data, the computer can create a two-dimensional distribution of intensity or peak wavelength shift which can be used to evaluate dislocation densities and correlate leakage currents, electrical resistivities, threshold voltage and drain source current.

The parameters of this computer-controlled system can be easily changed through menu displays. For enhanced data recovery, wafers, especially GaAs, can be cooled to liquid helium temperatures with a specially designed dewar. Another version of the system includes a double spectrometer for enhanced measurement of both Raman scattering and photoluminescence.

Radiometer for Calibration and Measurement in 0.3 to 0.2 μ m Region

SPEX Industries, Inc. has introduced the 1681IR Radiometer for detector calibration and radiometric measurements in the region between 0.3 and 2.0 μ m. The model 1681IR Radiometer supplies a wavelength-selectable source of radiation under total computer control. The output of a tungsten lamp is chopped at a variable rate, then dispersed by a scanning spectrometer with selectable band-pass. A lock-in amplifier then feeds data from the user's detector into the data system. Software is included for scanning, radiometric correction, smoothing and other manipulations. Options are available to extend the range of the system further in the infrared, or deeper into the uv.

SPEX Industries Inc., 3880 Park Ave., Edison, N.J. 08820, U.S.A. Contact: Ray Kaminski, Spectrometer Specialist (201) 549-7144.

New Products/Techniques

Brimrose introduces a new line of *Portable Image X-ray Intensifiers (PLXI)*. These units have phenomenal gain and spatial resolution. The PLXI can be used for real time X-ray imaging applications. Digital interfaces for computer image processing are also available.

Brimrose announces the *Digital Intensity X-ray Image Enhancer (DIXIE)*. This novel real time X-ray imaging system will adapt to all conventional X-ray apparatuses and camera systems. DIXIE, with spatial resolution of 100 microns, is a powerful quality control tool to screen various crystalline substrate materials for a multitude of microelectronic applications.

Brimrose introduces *Digital Automated Rocking Curve (DARC)* topography, a unique and novel X-ray topography technique. This technique allows quantitative dislocation density mapping of various crystalline substrates or epitaxial films and has tremendous potential for prefabrication material quality control. This technique can also be used to topographically map lattice parameter and epi-film thickness. It is envisioned that this screening method will phenomenally improve device yield.

Brimrose Corporation has developed a fully automated, micro-processor controlled, modified, Bridgman furnace. The design, acronymed "ANT" (Automated Non-translating Tube), has no moving parts and is equipped with operating software written in ANSI standard Fortran. "ANT" capable of multiple programming, is operational in the "remote mode" with the use of a telephone. It comes equipped with a standard RS232-C communication interface. The furnace is suited for industrial use, including production line application, and has novel Space Technology applications.

Phase II Contracts

The Defense Advanced Research Projects Agency (DARPA) has awarded Brimrose Corporation of America \$500,000.00 in Phase II Research funds for further development of a Real-Time X-ray topography system for the rapid characterization of epitaxial films of gallium arsenide (GaAs), gallium aluminum arsenide (GaAlAs) and mercury cadmium telluride (HgCdTe) on various substrates. This system is envisioned to be used as a quality control method for the instant evaluation of both films and/or substrates in production environments. It is hoped that the implementation of this method will save valuable time and costs to select good materials before further processing is performed on poor substrate and/or poor epitaxial materials. Applications of this technique include the evaluation of any bulk single crystal or large polycrystal substrates as well as various epitaxial film materials.

The Office of Naval Research has awarded Brimrose Corporation of America \$500,000.00 in Phase II Research funds for Solid Fuel Rocket Propellant Characterization used in both propulsion and explosive applications. These materials typically include organic, inorganic and polymeric crystals, e.g. (RDX/HMX ammonium perchlorate, aluminum, etc). The study is based on non-destructive, non-contact, non-intrusive, and quantitative X-ray techniques for characterizing micro-structural features of bulk crystalline powders. The computer aided X-ray material characterization methods developed and employed here are greatly amenable to production oriented environments involving remote crystal growth and characterization operations.

Phase I Contracts

The Department of the Army has awarded Brimrose Corporation of America \$52,894.00 in Phase I Research funds to study the correlation between micro-lattice strains and the sensitivity of propellants (RDX/HMX). A highly sophisticated non-destructive X-ray characterization technique known as DARC topography will be used to quantify dislocation density in propellant composites. Other real time X-ray techniques will also be employed to evaluate constituent phase composition and lattice parameters in dynamic experiments.

The Office of Naval Research has awarded Brimrose Corporation of America \$100,000.00 in Phase I Research funds to use IR imaging techniques to characterize hot spot activities in a co-rotating twin screw propellant extruder. It is anticipated that this research effort will divulge information about process induced damage on various propellant formulations specifically RDX/HMX and PBX composites.

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As a result of an oversight on the part of the publisher, the advertisement for Materials Data, Inc. (MDI) was left out of Powder Diffraction, Volume 1, Number 3. Their advertisement appears in this issue on page XIX.