

# MRS

# BULLETIN

May 1989

Volume XIV, Number 5

Serving the International Materials Research Community

## Silver Halides in Photography

Overcoat

Fast  
Yellow

Slow  
Yellow

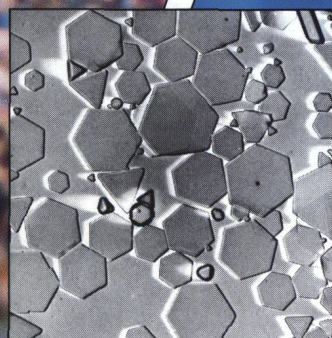
Fast  
Magenta

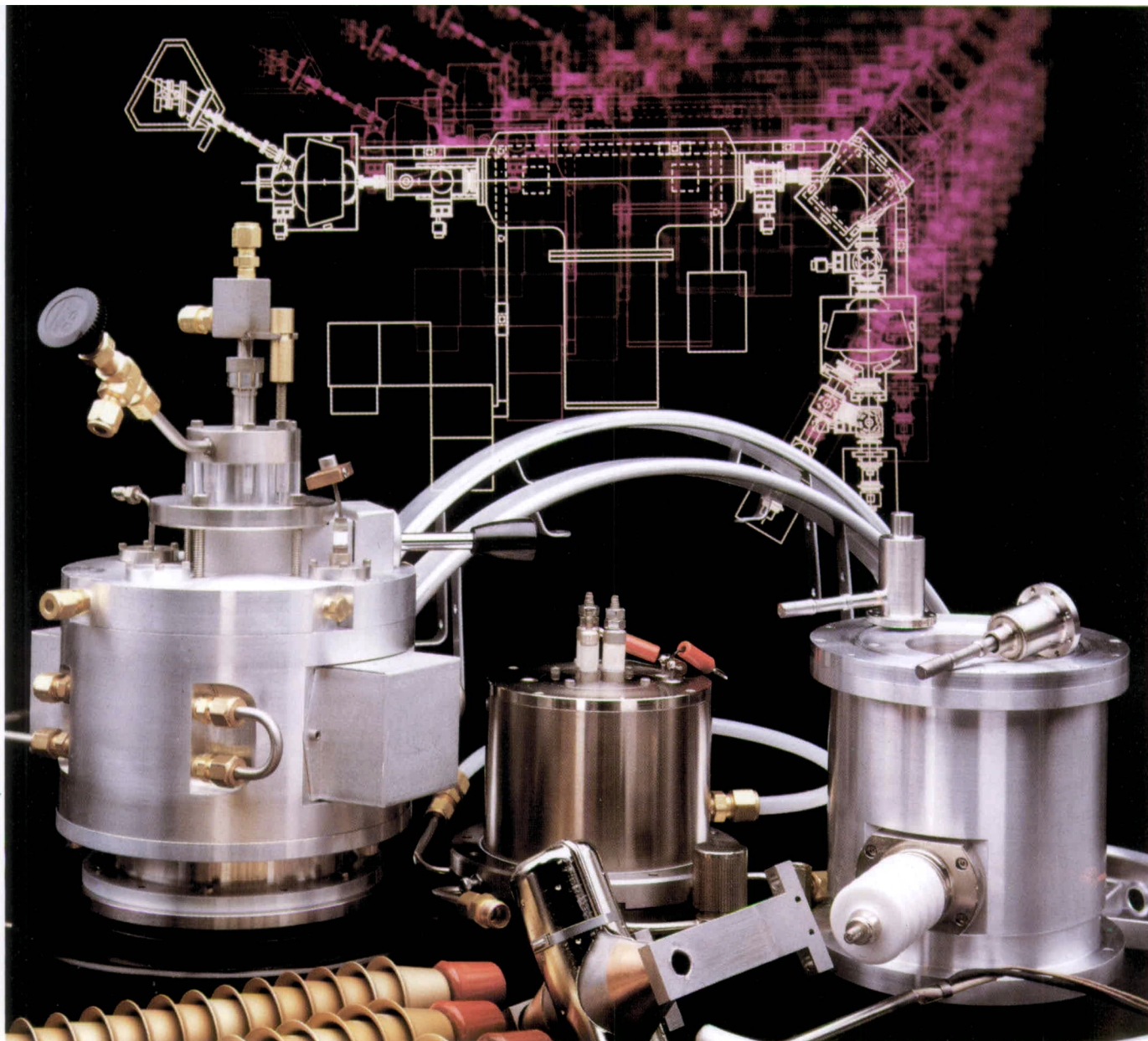
Slow  
Magenta

Fast  
Cyan

Slow  
Cyan

Kodacolor  
Gold 400





# ionX $\equiv$ ION BEAM PRODUCTS

General Ionex Corporation, the world leader in advanced ion beam technology, continues to offer the most up-to-date components and systems for the production of ion beams. With energies from the keV to MeV range, GIC ion beam products provide versatility, ease of operation and reliability. From basic ion sources to MeV analysis and materials modification systems, IONEX can cover the spectrum of your needs.

Our product line includes:

- Positive, negative ion sources
- Ion beam lenses, steerers, scanners
- Air insulated accelerator systems
- MeV Tandatron™ ion accelerators

- RBS Surface Analyzer
- MeV implantation systems
- Target chambers and manipulators

You can customize your system with a choice of manual or computer control, metal sealed flanges, vacuum systems, etc.

LET OUR TWENTY YEARS OF EXPERIENCE WORK FOR YOU. CONTACT US WITH YOUR SPECIFIC NEEDS.

GENERAL IONEX CORPORATION

19 Graf Road

Newburyport, MA 01950

Telephone (617) 462-7147

FAX 617 462 3543, TWX 710 347 6919

General Ionex Corporation **ionX**

A Publication of the Materials Research Society

Volume XIV, Number 5 ISSN: 0883-7694 CODEN: MRSBEA

## SILVER HALIDES IN PHOTOGRAPHY

- 13 Silver Halides in Photography**  
Y.T. Tan, Guest Editor
- 17 The Unique Electronic Properties of the Silver Halides**  
F.C. Brown
- 23 Modeling of Defects in Silver Halides**  
C.R.A. Catlow
- 31 Studies of Ion Transport in AgCl and AgBr**  
P.W.M. Jacobs
- 36 The Improbability of the Photographic Process**  
L. Slifkin

## INTERNATIONAL

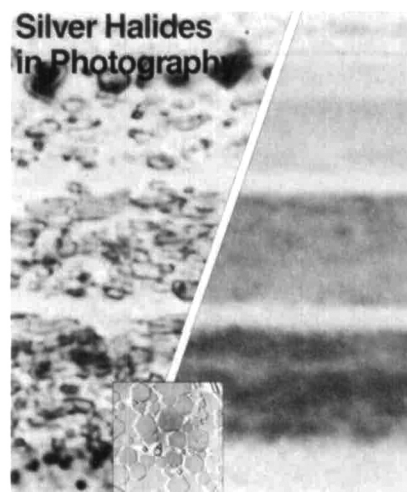
- 41 1988 E-MRS Meeting Highlights**  
**Superconductors, Particle Detectors, Magnets and Solid State Ionics**
- 45 European Networks Focus on Advanced Materials**

## MRS NEWS

- 46 Formation of International Materials Research Committee Moves Closer**
- 47 MRS Committees Announce 1989 Goals**
- 49 Bravman, Brinker, and Butler to Chair 1990 MRS Spring Meeting**

## DEPARTMENTS

- 3 Letter from the President**
- 4 Material Matters**
- 5 Research/Researchers**
- 9 Research Resources**
- 10 From Washington**
- 50 Chapter News**
- 51 Conference Reports**
- 54 Historical Note**
- 56 Book Reviews**
- 57 Calendar**
- 61 Classified**
- 62 Advertisers in this Issue**
- 64 Postterminaries**



**ON THE COVER:** Shown on the cover are cross-sectional micrographs of Kodacolor Gold 400 film. On the left is a cross-section of the unprocessed film showing the emulsion grains in the image-forming layers, and on the right is a cross-section showing the dye image of the exposed and processed film. The inset is a reflected light photomicrograph of Kodak T-grains, similar to those used in some current color negative films. The thinness of these T-grains offers many advantages when used in modern photographic films. (Photographs courtesy of Dr. Jim Rodgers, Eastman Kodak Co.)

## MRS BULLETIN

### Editor

G. A. Oare  
(412) 367-3036

### Assistant Editor

F. M. Wieloch  
(412) 367-3036

### Copy editors

S. W. Morelli, D. Sours

### Design/Production

C. Love  
(412) 367-3003

### Editorial Assistant

J. Dininny  
(412) 367-3036

### Advertising and Circulation

M. E. Kaufold  
(412) 367-3036

### Associate Editor—Europe

I. W. Boyd  
University College London  
Dept. of Electronic and  
Electrical Engineering  
Torrington Place  
London WC1E 7JE  
United Kingdom  
01-387-7050  
ext. 3956 or 7340

### Contributors

K. J. Anderson,  
R.C. Ewing, L. Zanotti

### Guest Editor

Yen T. Tan

### Editorial Chairman

E. N. Kaufmann  
Lawrence Livermore National Laboratory  
Livermore, California

### International Advisory Board

M. Balkanski University of Pierre and Marie Curie Paris, France	R. Roy Pennsylvania State University University Park, Pennsylvania
S. Hsu Chung Shan Institute of Science and Technology Taiwan, China	G. D. W. Smith University of Oxford Oxford, United Kingdom
R. Krishnan Defense Research and Development Organization New Delhi, India	T. Sugano University of Tokyo Tokyo, Japan
H. D. Li Tsinghua University Beijing, China	J. S. Williams Royal Melbourne Institute of Technology Melbourne, Australia

## 1989 MRS EXECUTIVE COMMITTEE

### President

R. P. H. Chang  
*Northwestern University*

### First Vice President and President-Elect

R. R. Chianelli  
*Exxon Research  
and Engineering*

### Second Vice President

J. B. Roberto  
*Oak Ridge National  
Laboratory*

### Secretary

J. M. Phillips  
*AT&T Bell Laboratories*

### Treasurer

S. M. Kelso  
*Xerox Palo Alto Research  
Center*

### Immediate Past President

J. E. E. Baglin  
*IBM Almaden Research  
Center*

**Executive Director**  
**Materials Research Society**  
John B. Ballance

## EUROPEAN MRS

### P. Siffert

Centre de Recherches Nucleaires  
Laboratoire PHASE  
67037 Strasbourg, Cedex, France  
Telephone: (88) 28 65 43

### Technical Editorial Board

J. C. C. Fan Kopin Corporation Taunton, Massachusetts	R. L. Schwoebel Sandia National Laboratories Albuquerque, New Mexico
F. Y. Fradin Argonne National Laboratory Argonne, Illinois	R. C. Sundahl Intel Corporation Chandler, Arizona
G. L. Liedl Purdue University West Lafayette, Indiana	K. C. Taylor General Motors Warren, Michigan
S. Namba Osaka University Osaka, Japan	

### MRS BULLETIN

### Publications Subcommittee

M. H. Bennett Texas Instruments Dallas, Texas	P. Sliva General Electric Largo, Florida
R. R. Chianelli Exxon Research and Engineering Annandale, New Jersey	J. M. Phillips AT&T Bell Laboratories Murray Hill, New Jersey
R. J. Eagan Sandia National Laboratories Albuquerque, New Mexico	C. W. White Oak Ridge National Laboratory Oak Ridge, Tennessee

## ABOUT THE MATERIALS RESEARCH SOCIETY

The Materials Research Society (MRS) is a nonprofit scientific association founded in 1973 to promote interdisciplinary goal-oriented basic research on materials of technological importance. Membership in the Society includes more than 8,700 scientists from industrial, government, and university research laboratories in the United States and more than 25 countries.

The Society's interdisciplinary approach to the exchange of technical information is qualitatively different from that provided by single-discipline professional societies because it promotes technical exchange across the various fields of science affecting materials development. MRS sponsors two major international annual meetings encompassing approximately 30 topical symposia, as well as numerous

single-topic scientific meetings each year. It recognizes professional and technical excellence, conducts short courses, and fosters technical exchange in various local geographic regions through Section activities and Student Chapters on university campuses.

MRS is an Affiliated Society of the American Institute of Physics and participates in the international arena of materials research through associations with professional organizations such as European MRS.

MRS publishes symposia proceedings, the *MRS BULLETIN*, *Journal of Materials Research*, and other current scientific developments.

For further information on the Society's activities, contact MRS Headquarters, 9800 McKnight Road, Suite 327, Pittsburgh, Pennsylvania 15237; telephone (412) 367-3003; facsimile (412) 367-4373.