

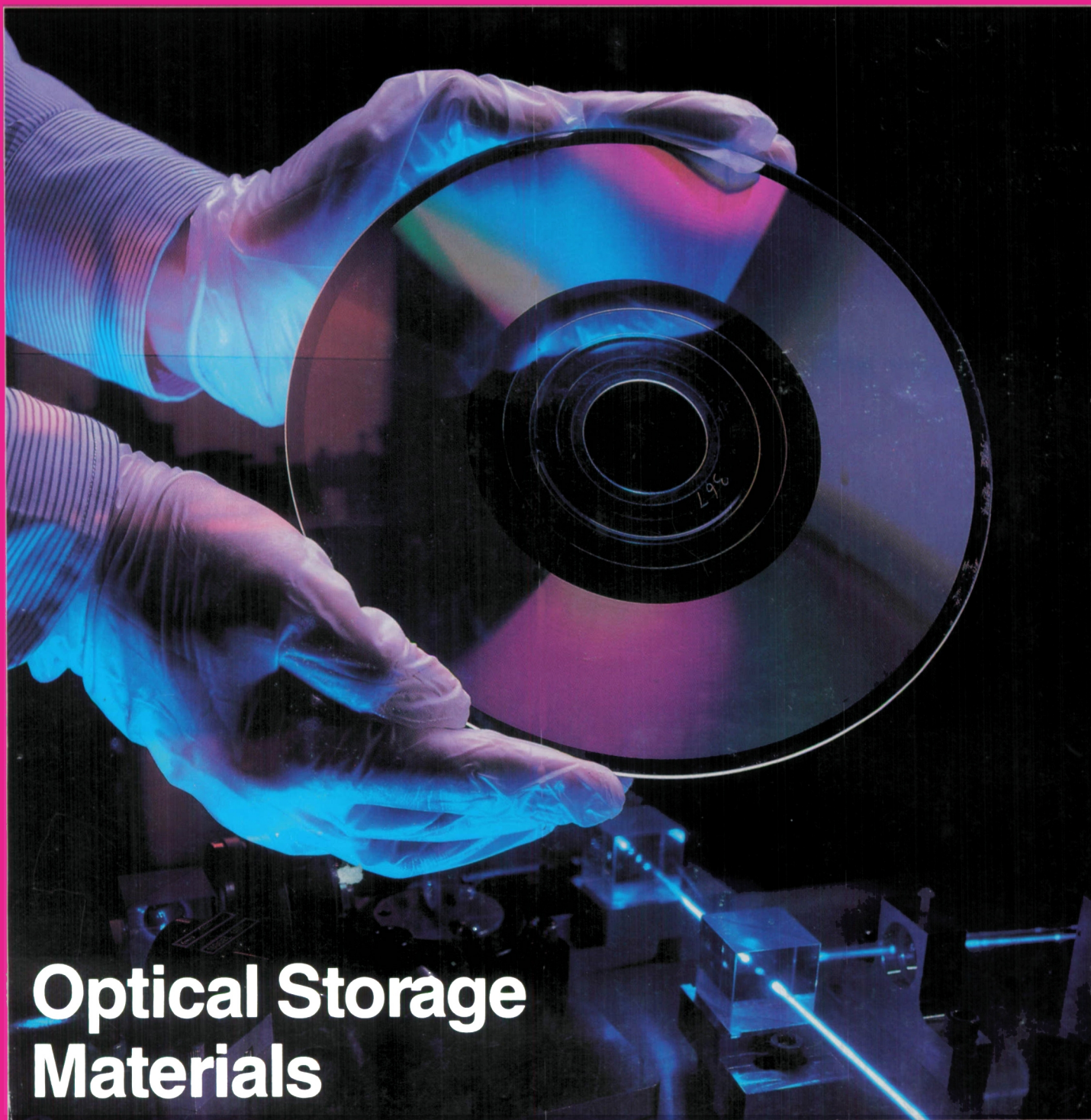
MRS

BULLETIN

April 1990

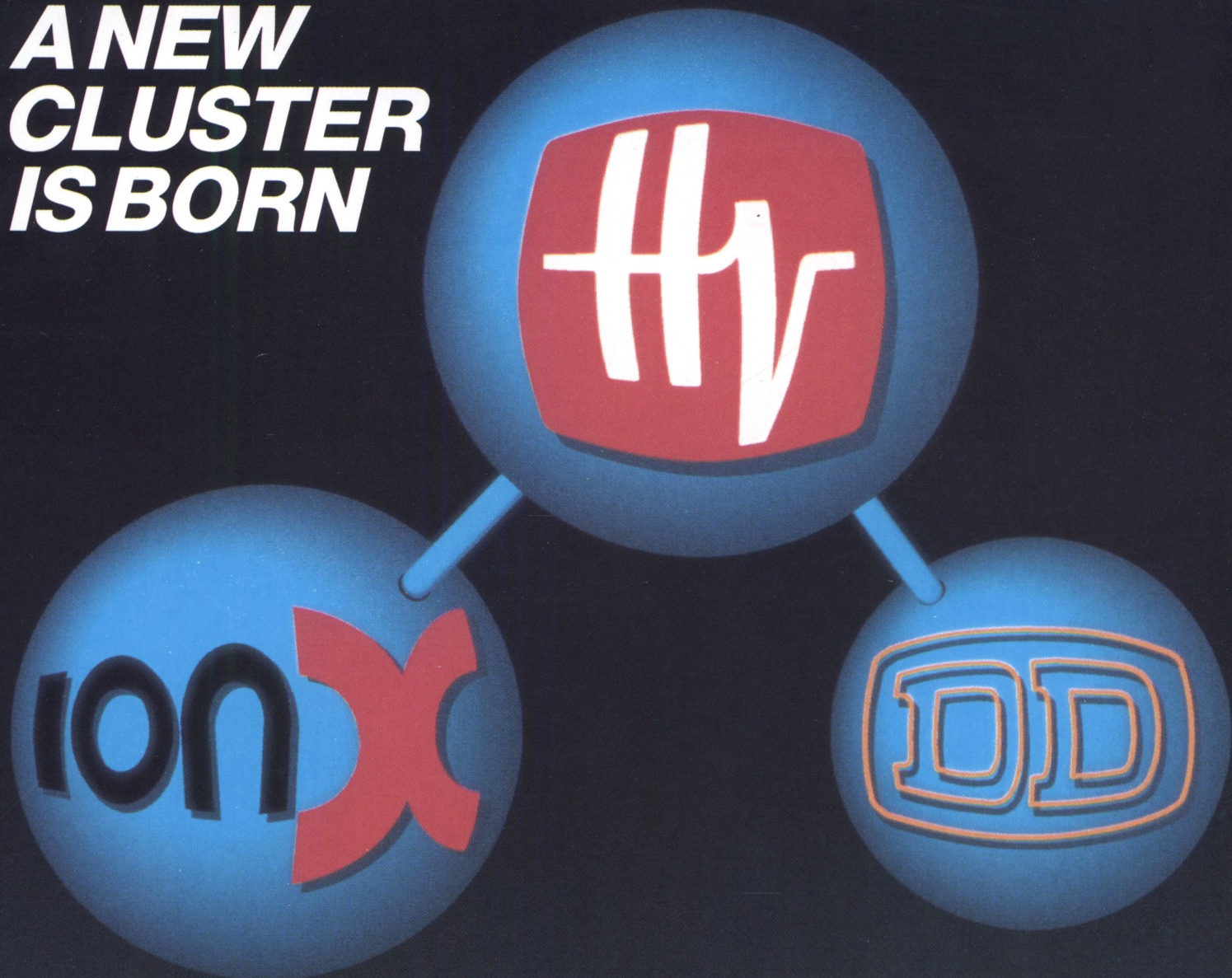
Volume XV, Number 4

Serving the International Materials Research Community



Optical Storage Materials

A NEW CLUSTER IS BORN



General Ionex acquired by High Voltage Engineering Europa B.V.

In December 1987 High Voltage Engineering Europa B.V. (HVEE) acquired Dowlish Developments Ltd (DD), an accelerator tube manufacturer located in the United Kingdom.

On April 10, 1989, HVEE purchased the General Ionex Analytical Product Group from Genus Inc. based in the United States.

Through this acquisition HVEE positions itself as the largest and most diverse manufacturer of particle accelerators for the scientific and industrial research communities.

The acquired General Ionex (GI) product lines, which include the Tandetron accelerator systems and Model 4175 RBS Analyser, will be manufactured in HVEE's new, well-equipped facility in Amersfoort, The Netherlands.

World wide marketing of all products from HVEE, DD and GI will originate from HVEE Amersfoort with sales and service offices in the USA, Europe and Japan.

After addition of the newly acquired products HVEE's product lines include:

- *Ion Accelerator Systems*
 - Air insulated accelerators up to 500 kV
 - Single ended Van de Graaff accelerators up to 4 MV
 - Tandem Tandetron accelerators up to 3 MV/TV
- *Research ion implanters*
 - Beam energies 10 keV-9 MeV and higher
- *Systems for ion beam analysis*
 - Systems for RBS, PIXE, PIGE, NRA, ERD, MACS and MEIS
- *Components*
 - HV power supplies, electron and ion accelerator tubes, ion sources beamline components, beam monitoring equipment, UHV sample manipulators, etc.

For further information on this transaction and product literature please contact HVEE in Amersfoort/NL.



**More
Energy for Research**

HIGH VOLTAGE ENGINEERING EUROPA B.V.

A Publication of the Materials Research Society

Volume XV, Number 4 ISSN: 0883-7694 CODEN: MRSBEA

OPTICAL STORAGE MATERIALS

- 20 Optical Storage Disk Technology**
R.J. Gambino, Guest Editor
- 25 Materials Challenges in Integrated Optical Recording Heads**
L.A. Weller-Brophy, B.J.J. Zelinski, and D.P. Birnie III
- 31 Magneto-Optical Storage Materials**
F.J.A.M. Greidanus and W.B. Zeper
- 40 Multilayered Thin-Film Materials for Phase-Change Erasable Storage**
M.R. Libera (Guest Editor) and M. Chen
- 46 Birefringence Properties of Polymeric Substrate Materials**
R.M. Pisipate, H. Schmid, and G. Kämpf
- 52 Trends in Optical Disk Mastering**
P.L.M. Put

INTERNATIONAL

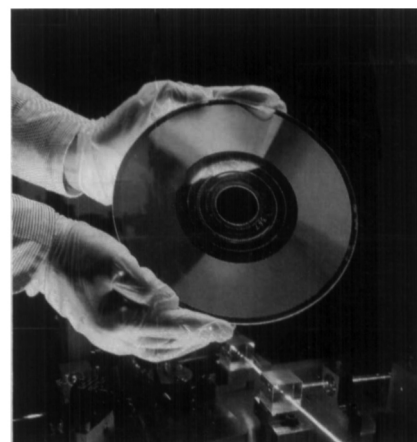
- 58 1989 E-MRS Spring Meeting Attracts Growing Audience**

MRS NEWS

- 60 1990 MRS Fall Meeting Call for Papers**

DEPARTMENTS

- 4 Letter from the President**
- 6 Material Matters**
- 8 Research/Researchers**
- 14 Research Resources**
- 16 From Washington**
- 19 Editor's Choice**
- 62 Upcoming Conferences**
- 63 Section News**
- 64 Historical Note**
- 66 Book Reviews**
- 67 Calendar**
- 71 Classified**
- 72 Advertisers in This Issue**



ON THE COVER: An experimental magneto-optical disk and a light beam from a 488 nm wavelength laser—key elements needed for high-density reversible optical storage. The light is from an argon gas laser used in a dynamic disk tester capable of writing 0.5 m diameter marks. Using light of this wavelength, writing and reading experiments have demonstrated a data density of over one billion bits per square inch. Compact solid-state sources of blue light are being developed for high-density optical storage applications. The potential for higher density optical storage is discussed in "Optical Storage Disk Technology" by Guest Editor R.J. Gambino on p. 20. Photograph by Donald Kenny, courtesy of IBM Research.

MRS BULLETIN

Materials Research Society • 9800 McKnight Road • Pittsburgh, PA 15237

MRS BULLETIN

Editor

G. A. Oare
(412) 367-3036

Assistant Editor

F. M. Wieloch
(412) 367-3036

Copy Editor

S. W. Morelli

Design/Production

C. Love, W. Appman
(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 WC1 E7 JE
United Kingdom
01-387-7050
ext. 3956 or 7304

Contributor

K. J. Anderson

Guest Editors

R. J. Gambino and
M. R. Libera

Chairman—Editorial Boards

E. N. Kaufmann
Argonne National Laboratory
Argonne, Illinois

International Advisory Board

M. Balkanski
University of Pierre and Marie Curie
Paris, France

S. Hsu
Chung Shan Institute of Science
and Technology
Taiwan, China

R. Krishnan
Defense Research and
Development Organization
New Delhi, India

H. D. Li
Tsinghua University
Beijing, China

R. Roy
Pennsylvania State University
University Park, Pennsylvania

G. D. W. Smith
University of Oxford
Oxford, United Kingdom

T. Sugano
University of Tokyo
Tokyo, Japan

J. S. Williams
Royal Melbourne Institute of
Technology
Melbourne, Australia

1990 MRS EXECUTIVE COMMITTEE

President

R. R. Chianelli
Exxon Research
and Engineering

First Vice President and President-Elect

J. B. Roberto
Oak Ridge National
Laboratory

Second Vice President

S. Cargill
IBM T.J. Watson
Research Center

Secretary

C.M. Jantzen
Westinghouse Savannah
River Co.

Treasurer

S. M. Kelso
Therma-Wave, Inc.

Immediate Past President

R. P. H. Chang
Northwestern University

Executive Director

Materials Research Society
John B. Ballance

EUROPEAN MRS

P. Siffert

Centre de Recherches Nucléaires
Laboratoire PHASE
67037 Strasbourg, Cedex, France
Telephone: (88) 28 65 43
Fax: (88) 28 09 90

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 9,500 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 40 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 University Chapters.

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.

Technical Editorial Board

J. C. C. Fan
Kopin Corporation
Taunton, Massachusetts

F. Y. Fradin
Argonne National Laboratory
Argonne, Illinois

G. L. Liedl
Purdue University
West Lafayette, Indiana

S. Namba
Osaka University
Osaka, Japan

R. L. Schwoebel
Sandia National Laboratories
Albuquerque, New Mexico

R. C. Sundahl
Intel Corporation
Chandler, Arizona

K. C. Taylor
General Motors
Warren, Michigan

MRS BULLETIN Publications Subcommittee

M. H. Bennett-Lilley
Texas Instruments
Dallas, Texas

R. R. Chianelli
Exxon Research and Engineering
Annandale, New Jersey

R. J. Eagan
Sandia National Laboratories
Albuquerque, New Mexico

P. Sliva
General Electric
Largo, Florida

J. M. Phillips
AT&T Bell Laboratories
Murray Hill, New Jersey

C. W. White
Oak Ridge National Laboratory
Oak Ridge, Tennessee

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

MRS BULLETIN (ISSN: 0883-7694) is published 12 times a year by the Materials Research Society, 9800 McKnight Road, Pittsburgh, PA 15237. Membership in MRS includes \$25.00 (\$15.00 for students) from membership dues to be applied to a subscription to the *MRS BULLETIN*. Application to mail at second class rates is pending at Pittsburgh, PA and at additional mailing offices. POSTMASTER: Send address changes to *MRS BULLETIN* in care of the Materials Research Society, 9800 McKnight Road, Pittsburgh, PA 15237; telephone (412) 367-3003; fax (412) 367-4373.

Back volumes of this publication are available in 16mm microfilm, 35mm microfilm, or 105mm microfiche through University Microfilms Inc., 300 North Zeeb Road, Ann Arbor, Michigan 48106.

**When you want a microbalance
with 7 place sensitivity for what
some scientists pay for 6 places...**



Cahn's the right place.

The Cahn C-31 has both ultra-microgram and microgram sensitivity at the price of a microbalance. And you get this sensitivity from a balance offering a large chamber for filter weighing and stability for better accuracy. Call us. Find out how our full line of rugged, dependable microbalances have made research easier for scientists around the world.

CAHN

When You Have Weighed the Alternatives—The Decision is Cahn.

Cahn Instruments, Inc., 16207 S. Carmenita Road, Cerritos, CA 90701
(800) 423-6641, in CA call (213) 926-3378, **FAX (213) 926-6969**