John Hilliard Memorial Chair Endowed at Northwestern

Northwestern University has established an endowed Chair in the memory of Prof. John Hilliard. Designated for outstanding junior faculty, the Chair will be awarded to a given person for a limited period of time. Besides the honor of being named the recipient of the Chair, the awardee will have the funds derived from the endowment to further his/her research.

Individuals who would like to participate in this project are invited to send their contributions to J.R. Weertman, Chairman, Department of Materials Science and Engineering, Northwestern University, Evanston, IL 60208. Checks should be made payable to Northwestern University-MSE, and clearly designated for the Hilliard Memorial Fund.

William O. Baker Honored by FMS

The Federation of Materials Societies has conferred its 1987 National Materials Advancement Award on Dr. William O. Baker (above left), former president of Bell Laboratories. The Award's previous two recipients were Dr. Paul C. Maxwell (1985), science consultant to the U.S. House of Representatives Committee on Science, Space and Technology, and Prof. John B. Wachtman (1986), director of the Center for Ceramics Research at Rutgers University. Baker, who received the MRS Von Hippel Award in 1978, was honored at a reception and ceremony at the National Press Club on December 10, 1987.

The Federation of Materials Societies (FMS) is a Washington, DC-based umbrella organization representing dozens of technical societies in the materials fields.

First High Temperature Superconductor Motor Developed at Argonne

The world's first electrical motor based on the unique properties of high temperature superconductors has been built by the U.S. Department of Energy's Argonne National Laboratory. Called the Meissner motor, the simple demonstration unit operates at about 50 revolutions per minute.

"We built it to show that simple, operating motors can be made with new superconducting ceramics," said Roger Poeppel of Argonne. "It's too small for practical use and produces negligible power, but it demonstrates for the first time that these motors are possible."

The Meissner motor consists of an 8.5-inch, circular aluminum plate with 24 small electromagnets mounted along the bottom of the outer edge. The aluminum plate rotates above two disks, shaped like hockey pucks and made of yttrium-barium-copper oxide. This material becomes a superconductor at about -290°F (94 K).

As an electromagnet approaches a superconductor, the electromagnet is switched on, creating a magnetic field. The superconductor responds by producing its own magnetic field to push the magnet away. The aluminum plate continues to spin as electromagnets rotate past the superconductors, are switched on and get pushed away.

The first public showing of the motor will be at the February meeting of the American Association for the Advancement of Science in Boston, and will be seen later at the Museum of Science and Industry in Chicago.

NSFNET to be Expanded and Upgraded

The National Science Foundation has announced a multimillion-dollar agreement for the upgrading, expansion and management of NSFNET, a network for reliable high-speed data communication among the nation's research institutions. The five-year project will establish additional connections among regional networks, NSF's supercomputing consortia, and national networks serving specific scientific disciplines. In addition, established NSFNET links will be upgraded with fiber optic communications lines.

Among the federal agencies that operate networks to support scientific research, the consensus is that existing networks must be upgraded, expanded, and linked together in a National Research Internet in order to economically meet the scientific community's growing demand for network facilities.

The project involves government, industry and academic participation. NSF has awarded a five-year, $14 million grant to MERIT, Inc., a consortium of eight Michigan universities, to upgrade and manage NSFNET. MERIT currently manages Merit Computer Network, Michigan's higher education network. In addition, the state of Michigan will contribute $5 million, International Business Machines Corp. will contribute hardware and software worth approximately $20 million, and MCI Communications Corp. will contribute fiber optic communication lines and support services.

"With its increased capacity, NSFNET will give scientists and engineers better access to supercomputers and other unique scientific resources—data bases, particle accelerators, and radiotelescopes, to name a few," said Stephen Wolff, Director of NSF's Division of Networking and Communication Research and Infrastructure.

A scientist who uses NSFNET will be able to send experimental data quickly to a collaborator on another campus, watch the graphic result of a simulation on a supercomputer thousands of miles away, or send a paper to a publisher with camera-ready page layouts and graphics, Wolff said.

"By making it easier for academic, industrial, and government researchers to work together, the enhanced NSFNET will speed the pace at which basic knowledge is applied to the development of new technology."

The supernetwork also will make it easier for scientists to share software and other tools and products of their research, and will encourage coordinated research efforts by experts in diverse fields.

Cambridge University Becomes British Superconductivity Center

Cambridge University has been named the first British University Research Center in Superconductivity, selected over a joint application from the Universities of Birmingham and Warwick and a consortium led by Liverpool University.

The center is to be located at Cavendish Laboratory according to a report in *Superconductor Week*. During the first six years funding will be approximately $9.7 million, of which $5 million will be allocated during the initial two years. Funding is being provided by Britain's Science and Engineering Research Council (SERC).

https://doi.org/10.1557/S0883769400066276 Published online by Cambridge University Press

The major focus of the center will be the new materials' characterization, preparation and fabrication. A major application to be studied is microelectronics.

Dr. Jan Evetts, director of the university's multidisciplinary High Temperature Superconductivity Group, spoke recently at the MRS Fall Meeting in Boston, presenting the latest results of Cambridge's research in fabricating and testing high T_c wire using the 1-2-3 materials.

SERC also announced that a further $1.84 million will be made available to fund programs elsewhere in the U.K.

International Directory of Superconductivity Research to be Published

Pasha Publications Inc. has announced it will publish *The Superconductivity Directory,* which it describes as the first comprehensive, international directory of superconductivity research. Available in March 1988, the directory lists individuals from government agencies, academic institutions and businesses committed to researching, developing, marketing and funding the expanding scope of high temperature superconductors. The directory includes more than 1,000 individuals from 24 countries and lists their institutions, addresses, phone numbers, and areas of research. The directory is indexed by institution, location, and area of research.

For further information, contact Pasha Publications, Inc., 1401 Wilson Blvd., Suite 900, Arlington, VA 22209-9970; telephone (703) 528-1244.

National Research Council Identifies Priorities for Space Technology

A National Research Council committee recently recommended to NASA the priority breakthrough technologies necessary if the United States wishes to retain a competitive status in space.

In making its selections, the panel of 16 aerospace experts considered demands in four "driver missions"—space transportation, space science, national security, and humans in space. It identified eight key technologies that, it said, had been "relatively neglected" during the past decade or longer. According to the committee, advances will be needed in propulsion, technology for humans in space, life support systems, automation and robotics, power, materials and structures, information and control systems, and sensors. The committee recommended that NASA place its highest priority on advanced propulsion technologies.

Because the breakthrough advances will demand more support for basic research, the committee recommended that a minimum 7% of NASA's budget be allocated to research and development for the next decade. It also recommended that these funds be protected from short-term requirements of special operations such as the space station.

Details of the committee's report are published in *Space Technology to Meet Future Needs,* available from: National Research Council, Aeronautics and Space Engineering Board, 2101 Constitution Avenue NW, Washington, DC 20418; telephone (202) 334-2000.

Rockwell International to Develop Space Power Systems

Both NASA and the U.S. Department of Energy have selected Rockwell International, Rocketdyne Division, Canoga Park, CA, as the primary contractor to develop power systems for use in space.

Rockwell's multiyear, $1.6 billion contract with NASA Lewis Research Center, Cleveland, Ohio, is for the detailed design, development, test, evaluation, and construction of the electrical power system for the U.S. space station. The power system will provide electricity for space station crew life support systems, experiments, communications, and data processing. It is required to have the capability to deliver 75 kW of power with a growth potential to 300 kW.

Rockwell's eight-year contract with DOE is the first step in a joint program of the Departments of Energy and Defense to demonstrate a Dynamic Isotope Power System (DIPS) that would provide from one to 10 kW of electricity for military spacecraft that could be used for surveillance, communications, and navigation. A flight version of DIPS would use the heat from the natural decay of a radioisotope to drive a turbine/alternator to produce electricity. Radioisotope thermoelectric generators, such as those used for NASA's Voyager and Pioneer spacecraft, produced relatively low power and had a 5-10% efficiency. The new DIPS would have efficiencies approaching 27%. □

https://doi.org/10.1557/S0883769400066276 Published online by Cambridge University Press

A summary of new products and services for materials research...

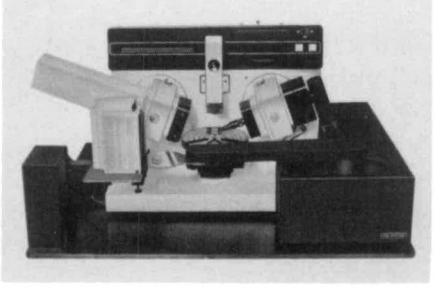
Turbomolecular Pump: High-performance Turbovac 50 with DN35CF flange eliminates flange adaptors and reduces space requirements. Features include modular single-unit construction, low vibration, quiet operation, and low maintenance. Normal operating temperature up to 35°C requires no additional cooling; air or water cooling is optional. Leybold Vacuum Products Inc., 5700 Mellon Road, Export, PA 15632; (412) 327-5700.

Superconductors in Electronics: Proceedings of a commercialization workshop held in San Francisco on September 14-15, 1987 covers new superconductor materials, electronic applications, specialized materials technologies for electronic applications, raw materials, cooling technology for potential systems, and patent law and venture capital perspectives. Advantage Quest, 1110 Sunnyvale-Saratoga Road, Suite C2, Sunnyvale, CA 94087-2515; (408) 733-0818.

Japan Directory of Materials: Concise 51-page directory to Japanese companies, institutions, and societies involved in materials science lists: 1,500 companies including raw materials manufacturers, processors, users, processing machinery makers, and R&D companies; 100 national and public research institutes and laboratories; 200 nonprofit academic and industrial associations, societies, federations, and foundations; universities, colleges, technical colleges, and related research institutes; and companies related to materials information. Each section uses distinct abbreviations to further define the specialty of each directory entry. Price: $100 in Japan, $120 abroad. Technical Information Service, 2-20, Nishihara 5 chome, Tanashi-shi, Tokyo 188 Japan.

Advances in Cement Research: International quarterly journal deals with the fundamentals of cement science, covering cement manufacture and materials, hydration of cement and cement compounds, properties and durability of cementitious materials and systems, interaction of cements with other materials, analysis and testing, special cements and applications. Besides original papers on current international research on cements, the journal contains review articles, technical notes, discussion contributions, book reviews, news, and events. Palladian Publications Ltd., 11 Grosvenor Crescent, London SW1X 7EE, England; 01-245-6767.

Ellipsometer Wafer Handling Robot: Wafer handling robot operates with the AutoEL series automatic ellipsometer.



The single-cassette, random access system handles 100 mm, 125 mm, or 150 mm samples without use of belts or air track. It can be ordered as an AutoEL option or a retrofit for existing systems. Rudolph Research, One Rudolph Road, Box 1000, Flanders, NJ 07836; (201) 691-1300.

Tribometer: Pin-on-disc type instrument precisely measures friction and wear properties of materials and the functional lifetime of tribological coatings. Easy-to-use tribometer is provided with complete disc and ball holders, weights spares, and instruction manual. Microscience, Inc., 41 Accord Park Drive, Norwell, MA 02061; (617) 871-0308.

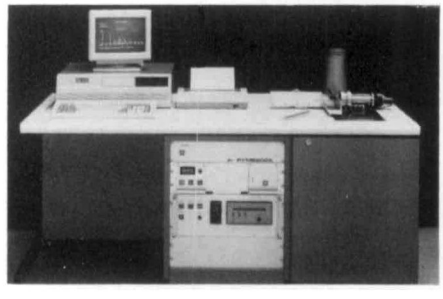
Nikkei High Tech Report: English-language biweekly report monitors Japanese developments in electronics, computers, telecommunications, biotechnology, new materials, energy, and medicine. Each 16-page issue contains licensing, joint venture or partnership opportunities with a survey of the 20 most promising Japanese high-tech products. It probes Japanese corporate strategies, marketing trends, government policies and regulations, and R&D efforts. The report also includes highlights of two market surveys, one of U.S. products in Japan and the other of leading Japanese executives on various high tech topics. Pasha Publications, 1401 Wilson Blvd., Arlington, VA 22209; (703) 528-1244.

Federal Conference on Commercial Applications of Superconductivity: 52-page transcript from the conference held in Washington, DC on July 28-29, 1987 highlights more than 30 speakers including keynote speaker President Ronald Reagan. (See the MRS BULLETIN, Vol XII No. 5, 1986, p. 50, for a report on this conference.) Single copies are available as a free service to subscribers of *Superconductor Week*, but additional copies may be purchased by both subscribers ($35) and nonsubscribers ($50). Atlantic Information Services, Inc., 1050 17th Street NW, Suite 480, Washington, DC 20036; (202) 775-9008.

Japanese Superconductivity Reports: *Superconductor Week* now contains translated excerpts and summaries of articles appearing in *Nikkei Superconductors*, a new biweekly Japanese language newsletter published in Tokyo. Atlantic Information Services, Inc., 1050 17th Street NW, Suite 480, Washington, DC 20036; (202) 775-9008.

Japan Ceramic Abstracts: English-language abstracts of the annual meeting of the Ceramic Society of Japan, held on May 12-14, 1987 in Nagoya, Japan, provide abundant information on Japanese R&D trends in fields such as ceramics, glasses, and carbon materials. Price: $175 in Japan, $200 abroad. Technical Information Service, 2-20 Nishihara 5 chome, Tanashi-shi, Tokyo 188 Japan.

Pyrolysis Mass Spectrometer: High-speed PYMS-200 from Horizon Instruments uses a chemical analysis technique based on the rapid pyrolysis of a small quantity of sample into a gas-phase pyrolysate which is then formed into a molecular beam and analyzed with a mass



spectrometer. Analysis can be performed quickly and results are repeatable. A PC-AT style computer provides fully automated operation and data analysis, and allows building a library of known samples with subsequent identification of unknowns. Microscience, Inc., 41 Accord Park Drive, Norwell, MA 02061; (617) 871-0308.

https://doi.org/10.1557/S0883769400066276 Published online by Cambridge University Press

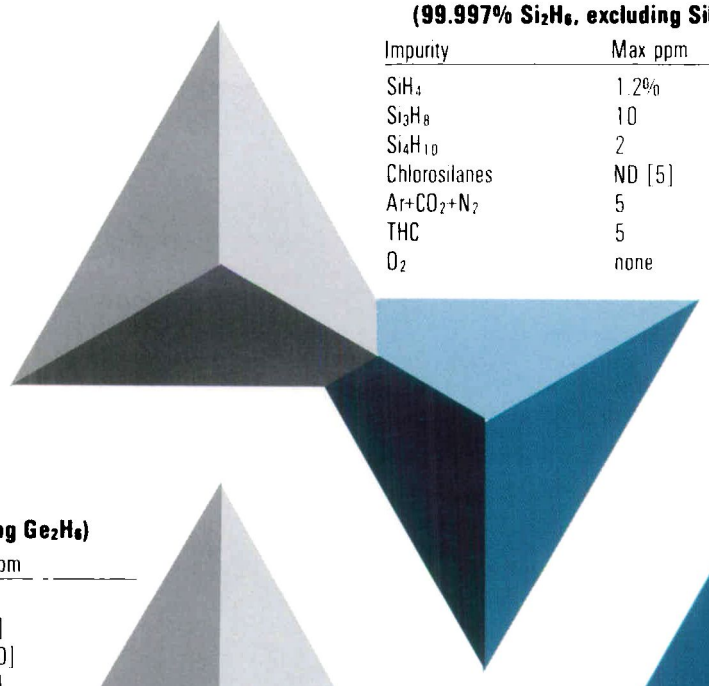
Voltaix

VOLTAIX OFFERS:

DISILANE

(99.997% Si_2H_6, excluding SiH_4, H_2)

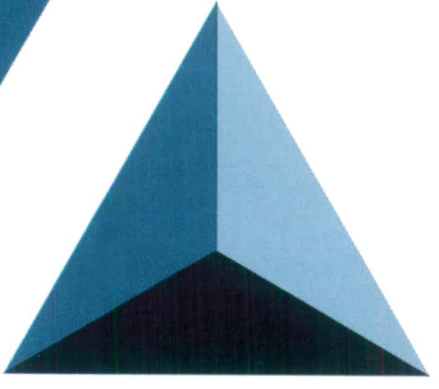
Impurity	Max ppm
SiH_4	1.2%
Si_3H_8	10
Si_4H_{10}	2
Chlorosilanes	ND [5]
$Ar+CO_2+N_2$	5
THC	5
O_2	none



GERMANE

(99.999% GeH4, excluding Ge_2H_6)

Impurity	Max ppm
Ge_2H_6	20
Ge_3H_8	ND [1]
H_2	ND [50]
germoxanes	ND [5]
chlorogermanes	ND [5]
N_2, CO_2	2 each
THC, H_2O, O_2, CO	1 each



SILANE

(99.999% SiH4, excluding H2)
Resistivity, n-type 1000ohm-cm

Impurity	Max ppm
Si_2H_6	5
Si_3H_8	ND (1)
H_2	100 (typical)
disiloxane	2
chlorosilanes	none
N_2	2
THC, H_2O, O_2, CO, CO_2	1 each

PLUS MIXTURES AND PHOSPHINE IN STEEL OR POLISHED STEEL OR ALUMINUM CYLINDERS WITH MANUALLY OR PNEUMATICALLY OPERATED CYLINDER VALVES WITH CGA OR "KEYED" VCR OUTLETS.

We will custom fill your requirements to meet your internal quality and safety specifications. Please inquire about ion implant gases and electro-polished stainless steel cylinders and valves.

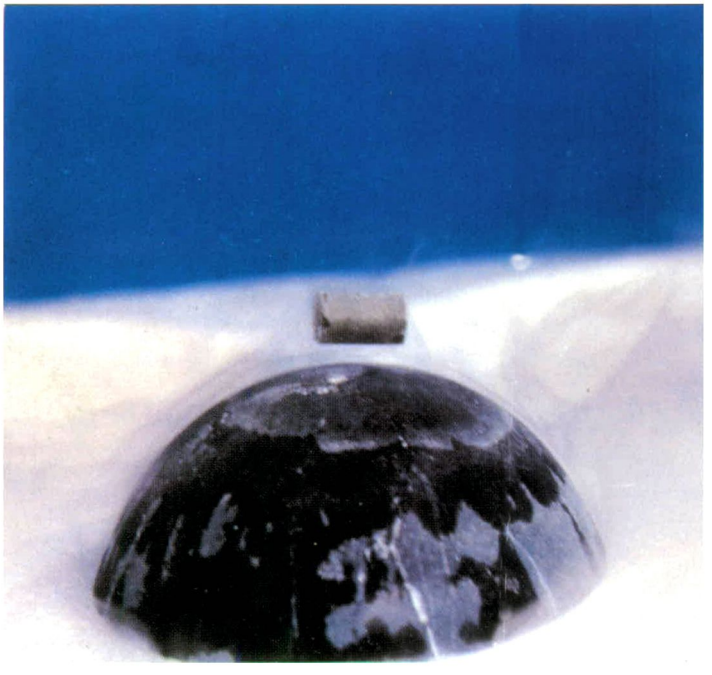
Call Jim Mann, VP of Sales, for further product information or quote.

Voltaix, Inc., P.O. Box 5357, 197 Meister Avenue, North Branch, NJ 08876
Tel: 201 231 9060, TWX: 9102500134 Voltaix UQ

Please visit booth no. 315
at the MRS Show in Reno, April 5-7, 1988.

https://doi.org/10.1557/S0883769400066276 Published online by Cambridge University Press

Figures appearing in the EDITOR'S CHOICE are those arising from materials research which strike the editor's fancy as being aesthetically appealing and eye-catching. No further criteria are applied and none should be assumed. When taken out of context, such figures often evoke images beyond and unrelated to the original meaning. Submissions of candidate figures are welcome and should include a complete source citation, a photocopy of the report in which it appears (or will appear), and a reproduction-quality original drawing or photograph of the figure in question.



For this month's EDITOR'S CHOICE we are compelled to depart from our own criteria, i.e., that figures should have been published in a journal or retrievable report. This issue's choice is also, by now, in a generic sense the ubiquitous symbol of high temperature superconductivity—a small permanent magnet levitated above a ceramic oxide superconductor cooled below T_c by liquid nitrogen. This particular "pose" of the common subject, however, elicits a surreal impression of a magnetic "satellite" in orbit above a superconducting "planet." The cloud-like condensation above the obscured cryogen and blue sky-like background add an eerie atmosphere, but they also confirm that this planet is not in the outer space we know, where skies are black and planets may be covered by but do not float on clouds. The photograph was contributed by Dr. Shu-en Hsu, Director of the Materials R&D Center at the Chung Shan Institute of Science and Technology, Taiwan, China. □

https://doi.org/10.1557/S0883769400066276 Published online by Cambridge University Press