

RESEARCH RESOURCES

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

Basic Vacuum Practice Manual: Expanded second edition of Varian's *Basic Vacuum Practice Manual*, like the first edition, overviews basic vacuum concepts, commonly used vacuum pumps, general pump maintenance and components such as gauges, materials, seals, valves and feedthroughs. Leak detection and troubleshooting tips are also covered. New features include detailed pump-down and back-to-air directions for bringing common vacuum systems (cryo, turbo, diffusion, ion) on line; tips on cryopump regeneration; expanded discussion of turbomolecular pumps, including maintenance; and a new discussion of oil-free mechanical pumping. Price: \$95 U.S. Training Dept., Varian Vacuum Products Division, 3560 Bassett St., Santa Clara, CA 95054; (800) 882-7426.

Thermistor Gauge: Designed as an alternative to thermocouple vacuum pressure measurement, the CVC GT 340 accurately reads from atmosphere to 1×10^3 torr. The durable gauge is suitable for chemical processing, vacuum distillation, transformer evacuation and back-filling, vacuum degassing and purification, metallurgical vacuum processing, and mechanical pump testing. The 1/2 rack package is supplied with interchangeable, pre-calibrated tubes and leak detect capabilities. The thermistor bead is encased in glass and housed in a nickel-plated, stainless steel envelope to control contamination and corrosion. CVC Products Inc., 525 Lee Road, P.O. Box 1886, Rochester, NY 14603; (716) 458-2550.

NdGaO₃ Single-Crystal Substrates For Superconductor Research: Single-crystal neodymium gallate for use as a substrate for superconductor thin films is now commercially available. NdGaO₃ reportedly has a dielectric constant and crystal structure similar to LaAlO₃ but does not undergo a phase transition in the normal processing temperature range for superconductor films. The transition temperature for NdGaO₃, 1350°C, is well above the most film deposition temperatures as well as the transition temperature (500°C) for lanthanum aluminate. NdGaO₃ has a distorted perovskite crystal structure and can be produced twin free. The substrates can be polished on one or both sides with an epitaxial polish and are currently available in sizes up to 1 in. in diameter. Larger sizes are under development. Marketch International, 414 S. Craig Street, Suite 300, Pittsburgh, PA 15213, (412) 421-3103.

Technology Transfer Surveys: Surveys, providing investigations into worldwide, state-of-the-art technology and development trends and conducted by a NASA Industrial Applications Center, can be commissioned by U.S.-based companies. Senior-level engineers from NASA, DOD, and DOE will conduct investigations according to specific client needs, covering such areas as materials, processes, software, and environment. Their reports will contain conclusions and recommendations. User fees are reasonable because costs are partially offset by NASA funding. ARAC, 611 North Capitol Ave., Indianapolis, IN 46204; (317) 262-5003.

NSF Graduate Research Fellowships: A pamphlet describing National Science Foundation's 1991 Graduate Research Fellowship programs is available beginning September to college juniors and seniors who are thinking about careers in science or engineering. The pamphlets and application materials are also available to colleges and universities for distribution to students. Fellowship Office, National Research Council, 2101 Constitution Avenue, Washington, DC 20418; (202) 334-2872

Metal Matrix Composites Information Analysis Center: The Metal Matrix Composites Information Analysis Center (MMCIAC), operated by Kaman Sciences Corporation, is the key Department of Defense information resource on metal matrix composites (MMC) technology and applications, covering basic and applied research and engineering. Services include application and technology analyses; materials comparison studies; materials properties and behavior analyses, including dynamic response and laser effects; test analyses and consultation; market analyses; optimization analyses; and comprehensive literature searches. The Center has a complete collection of DOD-sponsored technical reports on MMCs (3,000 documents) and an extensive worldwide open literature collection (1,500 documents), with an ongoing acquisitions program. Some services are free of charge, including quick-look technology assessments, properties data and data summaries, *Current Highlights* (the MMCIAC quarterly newsletter), literature searches on the Defense Technical Information Center's technical reports database, and selected conference paper and journal article reprints. The Center also offers special in-depth services on a cost-reimbursable basis. MMCIAC/Kaman Sciences Corporation, 816 State Street, Box 1479, Santa Barbara, CA 93102, (805) 963-6455.

U.S.-Japan Relationships Reports:

The National Research Council's Office of Japan Affairs has published two pamphlets as a result of a series of high-level discussions on advanced technology and international environment between the National Academies of Sciences and Engineering and a counterpart group of Japanese scientists, engineers, and industrialists. *Science, Technology, and the Future of the U.S.-Japan Relationship*, a 14-page issue paper, examines the linkages between science and technology and the broader context of trade, security, and diplomacy. It also identifies the challenges that must be faced if both countries are to remain on the front lines of science and technology. *Learning the R&D System: National Laboratories and Other Non-Academic, Non-Industrial Organizations in Japan and the United States*, a 46-page pamphlet, covers insights gained during a two-day meeting, held in 1989, of senior scientists, engineers, and research managers from Japan and the United States. The report compares and analyzes the many organizations in both countries that are not easily categorized as "industrial" or "academic" but that perform important roles in R&D, e.g. national laboratories, special corporations, government-owned organizations, and consulting, professional and hybrid organizations. Office of Japan Affairs, National Research Council, 2101 Constitution Avenue NW, Washington, DC 20418; (202) 334-2000.

Scandium Production: Recently completed full-time scandium production facility utilizes domestic ores and produces several kilograms of scandium oxide per week, ranging in purity from 98% to 99.995%. Increased availability of scandium from the new plant allows the company to sell scandium at more affordable prices. In past years, the high price and poor availability of scandium restricted its use mainly to research, although scandium can be used in electronics, catalysis, and alloys. Boulder Scientific Company, 598 3rd Street, Meade, CO 80542-0548; (303) 442-1199.

MBE Equipment: A 24-page product guide details the company's complete line of effusion cells and related equipment for molecular beam epitaxy (MBE), including dual filament cells, high temperature cells (2000°C), and cracking effusion cells. The guide also includes information on novel materials that can be evaporated with EPI effusion cells. EPI, 261 E. 5th Street, Saint Paul, MN 55101, (612) 224-1140. □