

Journal of Physical and Chemical Reference Data

CODEN: JPCRBU

ISSN: 0047-2689

ojps.aip.org/jpcrd

Co-Editors

Malcolm W. Chase, Jr., and John R. Rumble, Jr.
National Institute of Standards and Technology

Editorial Board

Term ending 31 December 2003

Robert E. Howard (The University of Tulsa, Tulsa, OK)
Ronald G. Munro (NIST, Gaithersburg, MD)

Term ending 31 December 2004

James K. Olthoff (NIST, Gaithersburg, MD)
Steven T. Manson (Georgia State University, Atlanta, GA)

Term ending 31 December 2005

David G. Shaw (University of Alaska Fairbanks, Fairbanks, AK)
Irwin L. Singer (Naval Research Laboratory, Washington, DC)

Management Board

John R. Rumble, Jr. (NIST), Thomas von Foerster (AIP)

Editorial Office and AIP Staff

Editorial Staff at NIST: Julian M. Ives, Linda Diane Decker

Production Staff at AIP (E-mail: jpr@aip.org; Fax: 516-576-2638):
Deborah McHone, *Manager*; Margaret Reilly, *Chief Production Editor*

Information for Contributors

Submissions: The Editor welcomes appropriate manuscripts for consideration as Journal articles or monographs. Potential contributors who are interested in preparing a compilation are invited to submit an outline of the nature and scope of the proposed compilation, with criteria for evaluation of the data and other pertinent factors, to: Editor, J. Phys. Chem. Ref. Data, National Institute of Standards and Technology, 820 Bldg., 820 West Diamond Ave., MS Stop 2310, Gaithersburg, MD 20899-2310.

Preparation: Manuscripts submitted for publication must be prepared in accordance with *Instructions for Preparation of Manuscripts for the Journal of Physical and Chemical Reference Data*, available on request from the Editor (Tel.: 301-975-3774; Fax: 301-926-0416; E-mail: jpcrd@nist.gov).

Color Printing: Authors or their institutions must bear the cost of any color they wish to use in their papers. A fixed rate of \$650 for the first color figure and \$325 for each additional color figure applies. For multipart figures, a single charge will apply only if all parts are submitted as a single piece of artwork.

Reprints: Authors may order reprints with or without covers only in multiples of 50 from AIP, Circulation & Fulfillment/Reprints, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502; Fax: 516-349-9704; Tel.: 1-800-344-6909 (U.S. & Canada), or 516-576-2270.

Supplemental Material may be deposited with AIP's Electronic Physics Auxiliary Publication Service (EPAPS), a low-cost online depository. For a nominal fee, authors may submit multimedia, color figures, data tables, text, etc. Address requests to the Editor; for additional information, see <http://www.aip.org/pubservs/epaps.html>.

Online Status Inquiry: During the production process, authors may access information about their accepted manuscripts at <http://www.aip.org/msinq/status.html>.

Journal of Physical and Chemical Reference Data (ISSN 0047-2689) is published quarterly by the American Institute of Physics (Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502) for the National Institute of Standards and Technology. 2003 subscription rates are: US\$795. POSTMASTER: Send address changes to *Journal of Physical and Chemical Reference Data*, AIP, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502. Periodicals postage rates are paid at Huntington Station, NY 11746, and at additional mailing offices.

One source of contributions to the Journal is The National Standard Reference Data System (NSRDS), which was established in 1963 as a means of coordinating on a national scale the production and dissemination of critically evaluated reference data in the physical sciences. Under the Standard Reference Data Act (Public Law 90-396) the National Institute of Standards and Technology of the U.S. Department of Commerce has the primary responsibility in the Federal Government for providing reliable scientific and technical reference data. The Standard Reference Data Program of NIST coordinates a complex of data evaluation centers, located in university, industrial, and other Government laboratories as well as within NIST, which are engaged in the compilation and critical evaluation of numerical data on physical and chemical properties retrieved from the world scientific literature. The participants in this NIST-sponsored program, together with similar groups under private or other Government support which are pursuing the same ends, compose the NSRDS.

The primary focus of the NSRDS is on well-defined physical and chemical properties of well-characterized materials or systems. An effort is made to assess the accuracy of data reported in the primary research literature and to prepare compilations of critically evaluated data which will serve as reliable and convenient reference sources for the scientific and technical community.

The objective of the Journal is to provide critically evaluated physical and chemical property data, fully documented as to the original sources and the criteria used for evaluation. Critical reviews of measurement techniques, whose aim is to assess the accuracy of available data in a given technical area, are also included. Papers which report new estimation or prediction techniques and test these techniques against existing databases are also accepted. The journal is not intended as a publication outlet for original experimental measurements such as those that are normally reported in the primary research literature, nor for review articles of a descriptive or primarily theoretical nature.

2003 Subscription Prices

	USA & Poss.	Americas	RoW	Surface	RoW Air
Print & online					
Members	\$127	\$147		\$147	\$157
Institutions	\$795	\$815			\$825

For Institutional subscriptions in Japan, contact AIP.

Online only (Rates apply for all subscriptions throughout the World.)

Members	\$67
Institutions	\$595

For Institutional subscriptions in Japan, contact AIP.

Annual CD-ROM	Add to subscription price:	Members: \$30	Institutions: \$50
Single issues	Back issues for 2003: \$220	Prior years (Institutions): \$220	Before 2002: \$140

Additional Availability

Online Access: *Journal of Physical and Chemical Reference Data* is available online at <http://ojps.aip.org/jpcrd>.

Customer Service

Subscription Orders and Renewals should be addressed to American Institute of Physics, P.O. Box 503284, St. Louis, MO 63150-3284. Tel.: 800-344-6902 (U.S. and Canada) or 516-576-2270; Fax: 516-349-9704; E-mail: subs@aip.org. Allow at least six weeks advance notice.

Inquiries, Address Changes, Claims, Single Copy Replacements, and Back Volumes: For address changes, please send both old and new addresses and, if possible, include the mailing label from a recent issue. Missing issue requests will be honored only if received within six months of publication date (nine months for Australia and Asia). Single copies of a journal may be ordered and back volumes are available. Contact AIP Customer Services at 800-344-6902 (U.S. and Canada) or 516-576-2270; Fax: 516-349-9704; E-mail: subs@aip.org.

Reprint Billing: Contact AIP Publication Charge and Reprints/CFD, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502; Tel.: 800-344-6909 (U.S. and Canada) or 516-576-2270; E-mail: pcr@aip.org.

Rights and Permissions

Copying: Single copies of individual articles may be made for private use or research. Authorization is given to copy articles beyond the use permitted by Sections 107 and 108 of the U.S. Copyright Law, provided the copying fee of \$37.50 per copy per article is paid to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, USA. Persons desiring to photocopy materials for classroom use should contact the CCC Academic Permissions Service. The Item Fee Code for this publication is 0047-2689/2003 \$37.50.

Authorization does not extend to systematic or multiple reproduction, to copying for promotional purposes, to electronic storage or distribution, or to republication in any form. In all such cases, specific written permission from AIP must be obtained.

Other Use: Permission is granted to quote from the journal with the customary acknowledgment of the source. To reprint a figure, table, or other excerpt requires the consent of one of the authors and notification to AIP. See journal home page for author's Web posting guidelines.

Requests for Permission: Address requests to AIP Office of Rights and Permissions, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502; Fax: 516-576-2450; Tel.: 516-576-2268; E-mail: rights@aip.org.

Copyright © 2003 American Institute of Physics. All rights reserved.

American Institute of Physics

Suite 1NO1

2 Huntington Quadrangle

Melville, NY 11747-4502 USA

www.aip.org

Mildred S. Dresselhaus	Chair, Governing Board
Marc H. Brodsky	Executive Director and CEO
Richard Baccante	Treasurer and CFO
Theresa C. Braun	VP, Human Resources
James H. Stith	VP, Physics Resources
Darlene A. Walters	Senior VP, Publishing
Benjamin B. Snively	Corporate Secretary

Since 1931 AIP has been promoting the advancement and diffusion of the knowledge of physics and its application to human welfare. It is the mission of the Institute to serve physics, astronomy, and related fields of science and technology by serving its Member Societies, individual scientists, educators, students, R&D leaders, and the general public with programs, services, and publications—Information That Matters.

AIP is committed to continuing its service mission by:

- keeping the physics community informed about advances in research as well as news of the community through its flagship magazine *Physics Today*;
- providing high-quality, cost-effective, timely production services for AIP and Society journals, and other publications either in print or electronic forms;
- publishing research and education-related journals, magazines, conference proceedings, newsletters, and software;
- identifying and addressing problems in the public's understanding and appreciation of science;
- improving science education through student organizations and outreach programs;
- providing physics career services;
- developing reliable information for the press and the community on the past, present, and projected future of physics, physicists, and their environment;
- promoting communication of ideas and opinions among members of the national and international physics community;
- providing sales, marketing, and information services aimed at wide dissemination of information on physics publications.

There are over 127,000 scientists represented by the Institute through its Member Societies. In addition, approximately 4,300 individuals in over 680 colleges and universities are members of the Institute's Society of Physics Students, which includes the honor society Sigma Pi Sigma. Industry is represented through 42 Corporate Associates members. AIP's flagship magazine, *Physics Today*, reaches all of these people and organizations.

National Institute of Standards and Technology

U.S. Department of Commerce

Gaithersburg, MD 20899 USA

www.nist.gov

U.S. Department of Commerce
Donald L. Evans, Secretary of Commerce
Technology Administration
Phillip J. Bond, Under Secretary of Commerce
for Technology
National Institute of Standards and Technology
Arden L. Bement, Jr., Director

The National Institute of Standards and Technology (NIST), formerly the National Bureau of Standards, was established by an act of Congress 3 March 1901. NIST works to strengthen U.S. industry's international competitiveness, advance science and engineering, and improve public health, safety, and the environment. With an annual budget of more than \$860 million and about 3000 staff members, NIST conducts science and engineering research in commercially important fields such as advanced materials, information systems, biotechnology, optoelectronics, computer-integrated manufacturing, and sensor technology.

NIST's laboratory research is designed to support development of critical emerging technologies and the new measurement methods and standards necessary to make them commercially viable. The ability of U.S.-based industries to exploit these new technologies determines in large part the health of the U.S. economy.

Several new NIST programs are designed to help spur innovation at U.S. businesses through seed money for development of generic technologies; grants to states for support of technology transfer programs; and financial and technical assistance to help small and mid-sized companies adopt more efficient manufacturing methods.

Throughout its history, NIST has helped industry to develop high-quality products and processes by supplying standard reference materials and data; by continuously improving technologies for precision measurements of mass, time, length, voltage, radiation, and other units; and through active participation in voluntary standards-setting bodies.