

1047 This Week in *Science*

## Editorial

1049 Frontiers in Materials Science: J. I. BRAUMAN

## Letters

1050 Forensic DNA Typing: C. WILLS; S. N. AUSTAD; R. A. BEVER, M. DEGLIELMO, R. W. STAUB, C. M. KELLY, R. S. FOSTER; L. R. YARBROUGH; D. W. CLEVELAND; D. E. KOSHLAND, JR.; R. CHAKRABORTY AND K. K. KIDD; R. C. LEWONTIN AND D. L. HARTL

## ScienceScope

1059 Two Alzheimer's models in trouble; risky business at EPA; etc.

## News & Comment

1060 The Calculus of Education Reform  
1062 U.S. R&D Spending: Half Full?  
1063 Zeroing in on Brain Toxins  
Malaria Vaccine on Trial at Last?  
1064 Tuberculosis Rebounds While Funding Lags  
1065 Canadian Chemist Takes on Working Women  
1066 Engineering Academy Elects New Members

## Research News

1067 Giving the Galaxies a History  
1068 LIGO Gets a Site  
1069 Infection With Selection: HIV in Human Infants  
1070 A Biopesticidal Tree Begins to Blossom  
1071 Human Ancestor Found—In Museum  
1072 Stem-Cell Gene Therapy Moves Toward Approval  
1073 *Briefings*: Rechanneling Soviet Scientific Talent ■ Medical Use for Bomb Waste ■ Experts Slam Olympic Gene Test

## Special Section

### Frontiers in Material Science

#### News Reports

1077 No More "Heat, Beat, and Hope"  
1078 Superconductors in Japan  
1080 Looking Eastward in Search of the Right Stuff

#### Articles

1082 Advanced Materials for Aircraft Engine Applications: D. G. BACKMAN AND J. C. WILLIAMS  
1088 Epitaxial Growth and the Art of Computer Simulations: H. METIU, Y.-T. LU, Z. ZHANG  
1093 Rapid Solid-State Precursor Synthesis of Materials: J. B. WILEY AND R. B. KANER  
1098 Innovative Materials Processing Strategies: A Biomimetic Approach: A. H. HEUER, D. J. FINK, V. J. LARAIA, J. L. ARIAS, P. D. CALVERT, K. KENDALL, G. L. MESSING, J. BLACKWELL, P. C. RIEKE, D. H. THOMPSON, A. P. WHEELER, A. VEIS *et al.*

■ SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005. Second-class postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 1992 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$87 (\$47 allocated to subscription). Domestic institutional subscription (51 issues): \$195. Foreign postage extra: Mexico, Caribbean (surface mail) \$50; Other countries (air assist delivery) \$95. First class, airmail, student and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. **Change of address:** allow 6 weeks, giving old and new addresses and 11-digit account number. **Postmaster:** Send change of address to *Science*, P.O. Box 2033, Marion, OH 43305-2033. **Single copy sales:** \$6.00 per issue prepaid includes surface postage; Guide to Biotechnology Products and Instruments, \$20. Bulk rates on request. **Authorization to photocopy** material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$1 per copy plus \$0.10 per page is paid directly to CCC, 27 Congress Street, Salem, Massachusetts 01970. The identification code for *Science* is 0036-8075/83 \$1 + .10. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

■ The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objectives are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, to advance education in science, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.



**COVER** Silicate glasses prepared with the sol-gel process that contain the encapsulated metalloproteins ferricytochrome c and ferrocyanochrome c, copper-zinc superoxide dismutase and its cyanide adduct, and metmyoglobin. For the samples arranged in a circular fashion, the outer circle consists of aged gels and the inner circle of the corresponding xerogels. See page 1113. This issue of *Science* focuses on advances in the design, synthesis, and processing of materials. [Photographs by Louis Meluso]

## Reports

- 1106 Rational Design and Synthesis of New Polymeric Materials: H. R. ALLCOCK
- 1113 Encapsulation of Proteins in Transparent Porous Silicate Glasses Prepared by the Sol-Gel Method: L. M. ELLERBY, C. R. NISHIDA, F. NISHIDA, S. A. YAMANAKA, B. DUNN, J. S. VALENTINE, J. I. ZINK
- 1115 Rectification of STM Current to Graphite Covered with Phthalocyanine Molecules: M. POMERANTZ, A. AVIRAM, R. A. MCCORKLE, L. LI, A. G. SCHROTT
- 1118 Rhenium-Osmium Isotope Constraints on the Age of Iron Meteorites: M. F. HORAN, J. W. MORGAN, R. J. WALKER, J. N. GROSSMAN
- 1121 Overlapping Nucleotide Determinants for Specific Aminoacylation of RNA Microhelices: C. FRANCKLYN, J.-P. SHI, P. SCHIMMEL
- 1125 Specific Acceptance of Cardiac Allograft After Treatment with Antibodies to ICAM-1 and LFA-1: M. ISOBE, H. YAGITA, K. OKUMURA, A. IHARA
- 1127 Isolation of Two Genes That Encode Subunits of the Yeast Transcription Factor IIA: J. A. RANISH, W. S. LANE, S. HAHN
- 1130 Transcription Factor IID Mutants Defective for Interaction with Transcription Factor IIA: S. BURATOWSKI AND H. ZHOU
- 1132 A Human Gene Responsible for Zellweger Syndrome That Affects Peroxisome Assembly: N. SHIMOZAWA, T. TSUKAMOTO, Y. SUZUKI, T. ORII, Y. SHIRAYOSHI, T. MORI, Y. FUJIKI
- 1134 Selective Transmission of Human Immunodeficiency Virus Type-1 Variants from Mothers to Infants: S. M. WOLINSKY, C. M. WIKE, B. T. M. KORBER, C. HUTTO, W. P. PARKS, L. L. ROSENBLUM, K. J. KUNSTMAN *et al.*
- 1137 Cytokine Stimulation of Multilineage Hematopoiesis from Immature Human Cells Engrafted in SCID Mice: T. LAPIDOT, F. PFLUMIO, M. DOEDENS, B. MURDOCH, D. E. WILLIAMS, J. E. DICK
- 1141 Form-Cue Invariant Motion Processing in Primate Visual Cortex: T. D. ALBRIGHT
- 1144 Association of cdk2 Kinase with the Transcription Factor E2F During S Phase: M. PAGANO, G. DRAETTA, P. JANSEN-DÜRR

## Book Reviews

- 1148 The Greater Yellowstone Ecosystem, *reviewed by* P. F. BRUSSARD ■ Lectures on Non-Perturbative Canonical Gravity, R. M. WALD ■ The Photosynthetic Apparatus, B. DINER ■ Vignettes: Technological Advance ■ Books Received

## Products & Materials

- 1153 Drug Discovery Software ■ Monoclonal Antibodies ■ DNA Fingerprinting Agarose ■ Hybridization System ■ Electrophoresis Unit ■ Amniotic Cell Medium ■ Nucleic Acid Blotting Membranes ■ Video Documentation System ■ Literature

### Board of Directors

Leon M. Lederman  
*Retiring President,  
Chairman*

F. Sherwood Rowland  
*President*

Eloise E. Clark  
*President-elect*

Mary Ellen Avery  
Francisco J. Ayala  
Robert A. Frosch  
Florence P. Haseltine  
Alan Schriesheim  
Jean'ne M. Shreeve  
Chang-Lin Tien  
Warren M. Washington

William T. Golden  
*Treasurer*

Richard S. Nicholson  
*Executive Officer*

### Editorial Board

Charles J. Arntzen  
Elizabeth E. Bailey  
David Baltimore  
William F. Brinkman  
E. Margaret Burbidge  
Pierre-Gilles de Gennes  
Joseph L. Goldstein  
Mary L. Good  
Harry B. Gray  
John J. Hopfield  
F. Clark Howell  
Paul A. Marks  
Yasutomi Nishizuka  
Helen M. Ranney  
Robert M. Solow  
Edward C. Stone  
James D. Watson

### Board of Reviewing Editors

John Abelson  
Frederick W. Alt  
Don L. Anderson  
Stephen J. Benkovic  
David E. Bloom  
Floyd E. Bloom  
Henry R. Bourne  
James J. Bull  
Kathryn Calame  
C. Thomas Caskey  
Dennis W. Choi  
John M. Coffin  
Bruce F. Eldridge  
Paul T. Englund  
Douglas T. Fearon  
Harry A. Fozzard  
Victor R. Fuchs

Theodore H. Geballe  
Margaret J. Geller  
John C. Gerhart  
Roger I. M. Glass  
Stephen P. Goff  
Corey S. Goodman  
Stephen J. Gould  
Ira Herskowitz  
Eric F. Johnson  
Stephen M. Kosslyn  
Konrad B. Krauskopf  
Michael LaBarbera  
Charles S. Levings III  
Harvey F. Lodish  
Richard Losick  
Anthony R. Means  
Mortimer Mishkin  
Roger A. Nicoll  
William H. Orme-Johnson III

Stuart L. Pimm  
Yeshayau Pocker  
Dennis A. Powers  
Ralph S. Quatrano  
V. Ramanathan  
Erkki Ruoslahti  
Ronald H. Schwartz  
Terrence J. Sejnowski  
Thomas A. Steitz  
Richard F. Thompson  
Robert T. N. Tjian  
Emil R. Unanue  
Geerat J. Vermeij  
Bert Vogelstein  
Harold Weintraub  
Zena Werb  
George M. Whitesides  
Owen N. Witte  
Keith Yamamoto

# Science

**255 (5048)**

*Science* **255** (5048), 1047-1153.

ARTICLE TOOLS

<http://science.sciencemag.org/content/255/5048>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

---

*Science* (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title *Science* is a registered trademark of AAAS.