CURRICULUM VITAE

Russell J. Hemley

Address: College of Liberal Arts and Sciences
University of Illinois Chicago
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***Education**:* Ph.D., Harvard University, Chemistry, 1983
M.A., Harvard University, Chemistry, 1980
B.A., Wesleyan University, Chemistry, 1977

***Professional Experience**:*

2019-	Liberal Arts and Sciences Distinguished Chair in the Natural Sciences, Professor of Physics and Chemistry, with appointment in Department of Earth and Environmental Sciences, University of Illinois Chicago
2016-2019	Research Professor, Institute of Materials Science and Department of Civil and Environmental Engineering, The George Washington University
2017	Mary Upson Visiting Professor, Department of Applied and Engineering Physics, Cornell University
2016-2018	Visiting Scientist, Geophysical Laboratory, Carnegie Institution
2016-2017	Physicist, Lawrence Livermore National Laboratory
2015-2017	Visiting Senior Scientist, Department of Chemistry, Georgetown University
2014-2018	Director, Energy Frontier Research in Extreme Environments (EFree), a DOE Energy Frontier Research Center
2014-2019	Chair, JASON Advisory Group
2009-2019	Co-Executive Director, Deep Carbon Observatory
2009-2014	Associate Director, Energy Frontier Research in Extreme Environments (EFree), a DOE Energy Frontier Research Center
2007-2013	Director, Geophysical Laboratory, Carnegie Institution
2003-	Director, Carnegie/DOE Alliance Center (CDAC), a DOE/NNSA Center of Excellence; now Chicago/DOE Alliance Center
2003-	Member, JASON Advisory Group
1987-2016	Senior Staff Scientist, Geophysical Laboratory
1996-1999	Visiting Professor, Ecole Normale Supérieure, Lyon, France
1991	Visiting Professor, Johns Hopkins University
1984-1987	Carnegie Fellow, Geophysical Laboratory, Carnegie Institution
1983-1984	Postdoctoral Fellow, Harvard University
1979-1983	Teaching Fellow/Research Assistant, Harvard University
1977-1978	Teaching Fellow/Research Assistant, Wesleyan University

Selected Honors and Awards:

Sack Lecturer, Cornell University, 2017
Mineral 'hemleyite' named by Italian scientists and approved by the International Mineralogical Association, 2016;
Marker Lecturer, Pennsylvania State University, 2016
Pimentel Lecturer, University of California – Berkeley, 2014
Bridgman Award, International Association for the Advancement of High Pressure Science and Technology, 2009
Honoris Causa Professor for Energetics, Mechanics, Machinery, and Control Systems, Russian Academy of Sciences, 2008
Corresponding Fellow, Royal Society of Edinburgh, 2008
Balzan Prize in Mineral Physics, 2005
Hillebrand Medal, American Chemical Society, 2003
Elected Member, National Academy of Sciences, 2001
Fellow, American Academy of Arts and Sciences, 1997
Fellow, American Geophysical Union, 1997
Fellow, American Physical Society, 1996
Alan Berman Research Pub. Award, Dept. of the Navy, 1996
Fellow, Mineralogical Society of America, 1990
Mineralogical Society of America Award, 1990
Phi Beta Kappa, 1977
Sigma Xi, 1977

Research Interests:

High-pressure behavior of materials, particularly Earth and planetary materials; transformations of hydrogen at multimegabar pressures; novel high-pressure compound formation and pressure-induced chemical reactions in molecular systems; synthesis and characterization of new superhard materials, superconductors, and magnetic materials; pressure-induced amorphization; the effects of pressure on amorphous solids; the rational design of new high-pressure materials from first-principles methods; models for Earth and planetary interiors; fabrication of single crystal diamond by chemical vapor deposition; development of high-pressure methods and analytical techniques such as micro-optical spectroscopy, synchrotron infrared spectroscopy, synchrotron x-ray diffraction and spectroscopy, laser heating, magnetic susceptibility, electrical conductivity, and high-pressure cryogenic methods; science issues related to national security.

Professional Service:

NRC Workshop on Physics and Chemistry of Earth Materials, Airlie, Virginia, 1986
Contributor, *Earth Materials Research,* edited by C. T. Prewitt et al., National Academy Press, Washington, D.C., 1987
Participant, Mineral Physics Workshop, American Geophysical Union Mineral Physics Committee Workshop, Lake Arrowhead, California, September 1988
Convenor, High-Pressure Mineral Physics, 1988 Goldschmidt Conference, Hunt Valley, Maryland
Contributor, *Synchrotron X-ray Sources and New Opportunities in the Earth Sciences*: *Workshop Report*, J. Smith and M. Manghnani, co-chairs, Argonne National Lab., Argonne, IL, 1988

Contributor, *Frontiers in Mineral Physics*, Report of the AGU Mineral Physics Committee, AGU, Washington, D.C. 1989, edited by T. J. Ahrens et al.
Program Committee, 12th AIRAPT Meeting, Paderborn, West Germany, July 1989
Member, GeoSynch Committee, American Geophysical Union, 1989-
Committee on Committees, Mineralogical Society of America, 1990
Committee for Study of the Earth's Interior (SEI), American Geophysical Union, 1990-
Associate Editor, *Journal of Geophysical Research*, 1991-1993
Contributor, *Science at the Frontier,* edited by A. Greenwood et al., National Academy Press, Washington, D.C. 1992
Co-Convenor, Symposium on Computational Physics in Mineralogy, 29th International Geological Congress, Kyoto, 1992
Session Organizer, Symposium on Cooperative Studies of the Earth's Deep Interior (CSEDI), Santa Fe, New Mexico, October 1993
Co-convenor, Thermoelasticity of Perovskite: Toward an Emerging Consensus, Special Session, Fall Meeting of the American Geophysical Union, San Francisco, California, 1993
Member, Program Committee, Joint AIRAPT/APS Meeting, Colorado Springs, Colorado, June 1993
Leader, Diamond-Anvil Cell Design Team, Geo/Soil/EnviroCARS (Consortium for Advanced Radiation Sources), University of Chicago and Advanced Photon Source, Argonne National Laboratory, 1993-
Co-convenor, Symposium on the Earth's Lower Mantle and Core, International Mineralogical Assocation Meeting, Pisa, Italy, September 1994
Co-convenor, Materials at High Pressure, Focused Session of the Division of Materials Physics, American Physical Society, March Meeting, Pittsburgh, Pennsylvania, 1994
Visiting Committee, CHESS High-Pressure Facility, Cornell University, September 1994
Editorial Board, *High-Pressure Research*, November 1994-
Chairman, GeoSynch Committee, American Geophysical Union, December 1995-1997
Member, Board of Governors, Consortium for Advanced Radiation Sources, Argonne, Illinois, 1996-1997
Co-chairman, Mineral Physics Committee, International Mineralogical Association, 1996-1998
Member, Mineral and Rock Physics Committee, American Geophysical Union, 1996-1998
Member, Roebling Medal Committee, Mineralogical Society of America, 1996-
Member, Steering Committee, Center for High-Pressure Research, 1996-
Spokesperson of U2A PRT of the NSLS, 1996-
Co-convenor, Symposium on Materials at High Pressure, Materials Research Society, Boston, November 1997
Member, Geophysical Laboratory Director Search Committee, 1997
Member, Bridgman Award Committee, AIRAPT, 1997-
Co-covenor, Mineralogical Society of America Short Course, “Ultrahigh-Pressure Mineralogy”, Davis, California, December 1998
Chairman, Mineral Physics Committee, International Mineralogical Association, 1998-
Member, High Pressure International Commission, Union of Crystallography, 1998-
Co-convenor, CIW-MSA-NSF Workshop “Mineralogy at the Millennium”, April 1999
Member, Program Committee, 17th AIRAPT Conference, 1999
Co-convenor, CECAM Workshop: Frontiers in High-Pressure Materials Physics, July 1999
Participant, NSF/NRC Workshop on Mineral and Rock Physics, May 1999

Member, High-Pressure Commission, International Union of Crystallography, 1999-
Member, Steering Committee, HPCAT, Advanced Photon Source, 1999-
Visiting Committee, Institute for the Study of the Earth's Deep Interior, Misasa, Japan, January 2000
Co-convenor, High-Pressure Neutron Scattering Workshop, Argonne National Lab, April 2000
Co-convenor, Laser-Heating Workshop, Advanced Photon Source, May 2000
Co-convenor, W. A. Bassett Symposium, AGU Spring Meeting, May 2000
Member, Program Committee, Warm Dense Matter Workshop, Vancouver, Canada, May 2000
Member, Program Committee, International Cryocrystals and Quantum Crystals Conference, Szklarska Poreba, Poland, July 2000
Co-convenor, IGC Mineral Physics and Chemistry Symposium, Rio de Janeiro, Brazil, Aug. 2000
Member, Program Committee, IUCr High-Pressure Workshop, SPRing8, Japan, Oct. 2000
Co-convenor, In Situ Techniques Symposium, Goldschmidt Conf., Roanoke, VA, May 2000
Advisory Editor, High-Pressure Research, 2000-
Director, Enrico Fermi School of Physics "High-Pressure Phenomena", Varenna, Italy, July 2001
Member, Program Committee, IUCr Workshop on Neutron and X-ray Diffraction, Saclay, France, October 2001
Member, Executive Committee, NSF COMPRES Consortium, 2002-2004
Co-PI, High-Pressure Beamline of the Spallation Neutron Source, Oak Ridge National Laboratory, 2002-
Member, Visiting Committee, Dept. of Earth and Planetary Sciences, Harvard University, 2003
Director, Carnegie/DOE Alliance Center (CDAC), 2003-
Member, Mineralogical Society of America Award Committee, 2004 -
Member, Program Committee, International Cryocrystals and Quantum Crystal Conference, Wroclaw, Poland, September 2004
Co-convenor, Roebling Symposium, Geological Society of America, 2005
Member, Visiting Committee, Dept. of Earth and Planetary Sciences, Harvard University, 2006
Member, Program Committee, IMA, Kobe, 2006
Member, Program Committee, ADC Conference, 2006
Co-convenor, Workshop on Synergy of 21st Century High-Pressure Science and Technology, Advanced Photon Source, Argonne, IL, 2006
Member, Selection Committee for the American Physical Society Shock Compression Science Award, 2006
Member, Visiting Committee, Department of Earth & Planetary Sciences, Harvard University, 2006
Member, Program Committee, Synergy of 21st Century High-Pressure Science & Technology Workshop, APS, 2006
Member, Project Advisory Committee, NSLS-II, 2006-2009
Co-convenor, High-Pressure Materials Science Symposium, MRS, Boston, 2007
Member, Program Committee, International Cryocrystals and Quantum Crystals Conference, Wroclaw, Poland, 2007 -
Co-chair, DOE-BES Basic Research Needs Workshop: Materials in Extreme Environments, 2007
Chair, Board of Governors, HPSynC, Argonne National Lab, 2007-
Member, Board on Earth Science and Resources, National Research Council, 2007–
Member, Advisory Board of Fizika Nizkikh Temperatur, 2008
Member, Review Committee, National Academy of Sciences, NCNR, NIST, 2008-2011

Member, Physical Sciences Directorate Review Committee, LLNL, 2008
Member, MaRIE External Advisory Committee, LANL, 2008-2014
Member, Advisory Committee, CC-2010 Conference on Cryocrystals and Quantum Crystals, 2009
Panel Lead, Future of Compression Science Workshop, LANL, 2009
Member, COMPRES Laser Heating Workshop Program Committee 2009
Member, Stanley Miller Medal Selection Committee, NAS, 2009
Member, LANS/LLNS Mission Committee, 2009-2015
Review Coordinator, NAS Comprehensive Test Ban Treaty Study, 2010
Vice-Chair, Energy Frontiers in Extreme Environments Center Steering Committee, DOE-BES EFRC, 2010-2014
Co-chair, Deep Carbon Observatory Executive Committee, A. P. Sloan Foundation/Carnegie Institution, 2010-2019
Member, CC2010 Program Committee, Chernogolovka, 2010
Member, Shock Compression in Condensed Matter Program Committee, APS, 2010-
Member, CHESS ERL Advisory Committee, Cornell University, 2010-2012
Member, Light Sources Directorate Science Advisory Committee, Brookhaven National Laboratory, 2010-2013
Panel Leader, National Ignition Facility User Science Workshop Committee, 2011
Member, Technical Committee, 2013 Joint APS/AIRAPT Conference, 2012-2013
Member, NSLS-II Beamtime Review Panel, Brookhaven National Laboratory, 2014-2017
Member, NIF & PS Directorate Review Committee, Lawrence Livermore National Laboratory, 2014-
Member, Program Committee, Novel Phases of Silicon Conference, 2015
Member, Advisory Board, 11th International Conference on Cryocrystals, and Quantum Crystals (CC2016), 2015
Member, DOE BESAC Subcommittee on Major Facilities, 2016
Panel Lead, NSF Workshop on Midscale Instrumentation for Quantum Materials, 2017
Member, DOE Review Committee of LCLS, 2018
Member, Radiation Effects and High Energy Density Science External Review Board, Sandia National Laboratories, 2018-2021
Panel Member, NSF Workshop on Basic Plasma Science User Facilities, 2019
Member, Second Target Station Instrument Review Committee (STS-IRC), Spallation Neutron Source, Oak Ridge National Laboratory, 2021-2022.
Member, National Academy Review Committee on High Energy Density Science, 2021-2023.
Member, Panel Lead, Spallation Neutron Source Second Target Station Grand Challenge Workshop, 2024.
Member, Organizing Committee, 24th Biennial Meeting of APS Topical Group on Compression of Condensed Matter Meeting, Washington, DC 2025.

Thesis Advisors:

V. Vaida, M. Karplus

Postgraduate Sponsors:

M. Karplus, R. G. Gordon, H. K. Mao, and P. M. Bell

Supervised Postdoctoral Fellows, Research Associates, and Research Scientists (95):

M. Ahart (Aihaiti), J. V. Badding, J. Badro, A. Basu, V. S. Bhadram, J. Blank, P. Beck, A. J. Campbell, R. Chellappa, A. Chen, J. Chen, X. J. Chen, J. Ciezak, D. A. Dalton, P. Dera, O. Degtyareva, M. Diamond, Y. Ding, T. S. Duffy, J. H. Eggert, M. I. Eremets, M. Furlanetto, Z. Geballe, A. F. Goncharov, S. A. Gramsch, E. Gregoryanz, Q. Guo, M. Hanfland, H. Hellwig, K. Hemawan, J. Z. Hu, D. Hummer, S. D. Jacobsen, A. P. Jephcoat, J. Jackson, J. Janik, P. E. Janolin, T. Jenkins, J. D. Kubicki, R. Kumar, A. Lazicki, P. Lazor, J. Li, M. Li, J. Lin, H. Liu, Z. Liu, R. Lu, Y. Ma, K. Matsuishi, I. I. Mazin, R. S. McWilliams, C. Meade, Y. Meng, Y. F. Meng, A. Mishra, J. Montoya, C. Murphy, T. Muramatsu, S. Nakano, S. Natarajan, I. Naumov, T. Okuchi, D. C. Palmer, R. J. Potter, J. Rodgers, F. Safari, N. Salke, C. Seagle, C. Sanloup, M. Santoro, C. Schiffries, H. P. Scott, T. Schindelbeck, A. Sharma, G. Shen, J. Shu, M. Somayazulu, Y. Song, S. Stewart, L. Stixrude, T. Strobel, V. V. Struzhkin, N. Subramanian, R. Thugoluva, Yu. A. Timofeev, S. Tkachev, O. Tschauner, W. L. Vos, K. Wang, M. Weinberger, Y. Wu, J. Xu, C. S. Yan, S. Yang, Y. Yoshimura, C. S. Zha, G. Zou

Supervised Ph.D. Students (29):

A. Cabrera, Y. Chen, P. G. Conrad, A. Denchfield, H. Farraj, P. Griffin, C. Halbert, S. Hazra, S. S. Ho, K. J. Kingma, J. D. Kubicki, J. Lai, A. Lamichhane, W. L. Mao, A. H. M. Marathamkottil, A. C. Mark, S. Merkel, M. Origlieri, J. R. Patterson, E. Poldi, R. Ripani, A. Shen, S. Shieh, B. Singson, D. M. Teter, E. Vinitsky, Z. L. Whipple, T. Zapata, C. Zoller

Supervised Undergraduate and High School Students (65):

L. Armstrong, E. Banigan, C. Barkett, A. Benjamin, K. Brownsberger, N. Czerwinski, B. Chidester, K. Chen, P. N. Chen, C. Chin, D. Cohen, J. Cohen, A. Davis, C. Farnsworth, K. Gan, D. A. Gonzalez, R. Graham, B. Haugen, K. Hernandez, T. Hittinger, A. Levedahl, Z. Liang, A. Lindoo, E. Littlefield, S. Jacobsen, M. James, Y. Kadry, S. Khattar, S. King, M. Krawczynski, R. Kundargi, A. Kung, S. Kung, T. Liu, W. Liu, L. Loubeyre, A. Madduri, M. Madduri, T. McHale, R. Mershon, J. Mesa, M. Moses, Z. Newman, K. Phillips, D. Platner, F. Reid, O. Reyes-Becerra, J. Rivera, D. Rodriguez, L. Rosario, M. Rose, V. Rozsa, C. Runge, E. Sandford, A. Savello, A. Schad, S. Scott, B. Shih, D. Shook, J. Simon, G. Sutton, I. Tamblyn, C. Tarabrella, R. Thomas, N. Valdez, C. Vallero, B. Wilfong, M. Wong, A. Young

Patents (18)

Recent Patent Disclosure: Quaternary hydrides with high temperature superconductivity and predictive structures thereof, with A. Denchfield and H. Park.

Edited Books:

1. *High-Pressure Materials Research. Materials Research Society Symposium, Vol. 499*, edited by R. M. Wentzcovitch, **R. J. Hemley**, W. J. Nellis and P. Y. Yu, Materials Research Society, Warrendale, Pennsylvania, 1998, 476 p.

2. *Ultrahigh-Pressure Mineralogy, Reviews in Mineralogy, Vol. 37,* edited by **R. J. Hemley**, Mineralogical Society of America, Washington, D.C., 1998, 671 p.
3. *Physics Meets Mineralogy - Condensed Matter Physics in Geosciences*, edited by H. Aoki, Y. Syono, and **R. J. Hemley**, Cambridge University Press, Cambridge, England, 2000, 396 p.
4. *High-Pressure Phenomena, Proceedings of the International School of Physics*, edited by **R. J. Hemley**, M. Bernasconi, L. Ulivi, and G. Chiarotti, IOS Press, Amsterdam, 2002.
5. *Materials Research at High Pressure*, *Symposium Proceedings*, *Vol. 987*, edited by M. R. Manaa, A. F. Goncharov, **R. J. Hemley**, and R. Bini, Materials Research Society, Warrendale, Pennsylvania, 2007.

Scientific Articles:

1977

1. **Hemley, R. J.,** and B. E. Kohler, Electronic structure of the visual chromophore: A mathematical model for the observed bandshapes, *Biophys. J.,* **20**, 377-382 (1977).

1979

2. **Hemley, R. J.**, B. E. Kohler, and P. Siviski, Absorption spectra for the complexes formed from vitamin A and *β*-lactoglobulin, *Biophys. J.,* **28**, 447-455 (1979).

1980

3. Roebber, J. L., D. P. Gerrity, **R. J. Hemley**, and V. Vaida, Electronic spectrum of furan from 2200 to 1950 A, *Chem. Phys. Lett.,* **75**, 104-106 (1980).

1981

4. **Hemley, R. J.**, D. G. Leopold, J. L. Roebber, and V. Vaida, Electronic absorption spectra of jet-cooled molecules: the S_2 state of styrene, *J. Phys. Chem.,* **85**, 134-135 (1981).
5. Leopold, D. G., **R. J. Hemley**, J. L. Roebber, and V. Vaida, Direct absorption spectra of higher excited states of jet-cooled monosubstituted benzenes: phenylacetylene, styrene, benzaldehydre, and acetophenone, *J. Chem. Phys.,* **75**, 4758-4759 (1981).
6. Vaida, V., N. J. Cooper, **R. J. Hemley**, and D. G. Leopold, Production of gas-phase bare transition-metal clusters by laser photodissociation of organometallic cluster compounds, *J. Am. Chem. Soc.,* **103**, 7022-7023 (1981).

1983

7. Dinur, U., **R. J. Hemley**, and M. Karplus, Equilibrium geometry and dynamics of the valence excited states of 1,3-butadiene, *J. Phys. Chem.,* **87**, 924-932 (1983).
8. **Hemley, R. J.**, J. I. Dawson, and V. Vaida, Franck-Condon analysis of the $1^1A_g \rightarrow 1^1B_u$ transition of 1,3-butadiene from absorption and Raman intensities, *J. Chem. Phys.,* **78**, 2915-2927 (1983).

9. **Hemley, R. J.**, D. G. Leopold, J. L. Roebber, and V. Vaida, The direct absorption spectrum of the $^1\Sigma_g^+ \rightarrow {}^1B_2{}^1(\Sigma_u^+)$ transition of jet-cooled CS_2, *J. Chem. Phys.,* **79**, 5219-5227 (1983)

1984

10. Kohler, B. E., T. Spiglanin, **R. J. Hemley**, and M. Karplus, Vibrational analysis of the lowest $^1B_u^+$ state of trans, trans 1,3,5,7-octatetraene, *J. Chem. Phys.,* **80**, 23-30 (1984).
11. Leopold, D. G., R. D. Pendley, J. L. Roebber, **R. J. Hemley**, and V. Vaida, Direct absorption spectroscopy of jet-cooled polyenes. II. The $1^1A_g \rightarrow 1^1B_u$ transitions of butadiene and hexatriene, *J. Chem. Phys.,* **81**, 4218-4229 (1984).

1985

12. **Hemley, R. J.**, U. Dinur, V. Vaida, and M. Karplus, Theoretical study of the ground and excited singlet states of styrene, *J. Am. Chem. Soc.,* **107**, 836-844 (1985).
13. **Hemley, R. J.** and R. G. Gordon, Theoretical study of solid NaF and NaCl at high pressures and temperatures, *J. Geophys. Res.,* **90**, 7803-7813 (1985).
14. **Hemley, R. J.**, M. D. Jackson, and R. G. Gordon, First-principles theory for the equations of state of minerals to high pressures and temperatures: application to MgO, *Geophys. Res. Lett.,* **12**, 247-250 (1985).
15. **Hemley, R. J.**, G. Leopold, V. Vaida, and M. Karplus, The singlet states of styrene. Theoretical vibrational analysis of the ultraviolet spectrum, *J. Chem. Phys.,* **82**, 5379-5397 (1985).
16. Mao, H. K., P. M. Bell, and **R. J. Hemley**, Ultrahigh pressures: optical observations and Raman measurements of hydrogen and deuterium to 1.47 Mbar, *Phys. Rev. Lett.,* **55**, 99-102 (1985).

1986

17. Bell, P. M., H. K. Mao, and **R. J. Hemley**, Observations of solid H_2, D_2, N_2 at pressures around 1.5 megabar at 25°C, *Physica B,* **139-140**, 16-20 (1986).
18. **Hemley, R. J.**, B. R. Brooks, and M. Karplus, Theoretical study of the ground-state vibrations of the linear polyenes, *J. Chem. Phys.,* **85**, 6550-6564 (1986).
19. **Hemley, R. J.**, H. K. Mao, P. M. Bell, and B. O. Mysen, Raman spectroscopy of SiO_2 glass at high pressure, *Phys. Rev. Lett.* **57**, 747-750 (1986).
20. **Hemley, R. J.**, H. K. Mao, and E. C. T. Chao, Raman spectrum of natural and synthetic stishovite, *Phys. Chem. Minerals,* **13**, 285-290 (1986).
21. **Hemley, R. J.**, H. K. Mao, P. M. Bell, and S. Akimoto, Lattice vibrations of high-pressure SiO_2 phases: Raman spectrum of synthetic stishovite, *Physica B,* **139-140**, 455-457 (1986).
22. Mehl, M. J., **R. J. Hemley**, and L. L. Boyer, Potential-induced breathing model for the elastic moduli and high-pressure behavior of the cubic alkaline-earth oxides., *Phys. Rev. B,* **33**, 8685-8696 (1986).

1987

23. Hazen, R. M., H. K. Mao, L. W. Finger, and **R. J. Hemley**, Single-crystal x-ray diffraction of n-H_2 at high pressure, *Phys. Rev. B,* **36**, 3944-3947 (1987).

24. **Hemley, R. J.**, Pressure dependence of Raman spectra of SiO_2 polymorphs: α-quartz, coesite, and stishovite, in *High-Pressure Research in Mineral Physics* (eds. M. H. Manghnani and Syono, Y.), 347-359 (Terra Scientific Publishing Company, Tokyo/American Geophysical Union, Washington, D. C., 1987).
25. **Hemley, R. J.**, P. M. Bell, and H. K. Mao, Laser techniques in high-pressure geophysics, *Science,* **237**, 605-612 (1987).
26. **Hemley, R. J.**, M. D. Jackson, and R. G. Gordon, Theoretical study of the structure, lattice dynamics, and equations of state of perovskite-type $MgSiO_3$ and $CaSiO_3$, *Phys. Chem. Minerals,* **14**, 2-12 (1987).
27. **Hemley, R. J.**, A. P. Jephcoat, H. K. Mao, C. S. Zha, L. W. Finger, and D. E. Cox, Static compression of H_2O-ice to 128 GPa (1.28 Mbar), *Nature,* **330**, 737-740 (1987).
28. **Hemley, R. J.** and H. K. Mao, Single-crystal micro-Raman spectroscopy of phases in the Y-Ba-Cu-O superconductor, *Phys. Rev. Lett.,* **58**, 2340-2342 (1987).
29. Jephcoat, A. P., H. K. Mao, L. W. Finger, D. E. Cox, **R. J. Hemley**, and C. S. Zha, Pressure-induced structural phase transitions in solid xenon, *Phys. Rev. Lett.,* **59**, 2670-2673 (1987).
30. Mao, H. K., **R. J. Hemley**, and E. C. T. Chao, The application of micro-Raman spectroscopy to analysis and identification of minerals in thin section, *Scanning Microscopy,* **1**, 495-501 (1987).

1988

31. **Hemley, R. J.**, A. P. Jephcoat, H. K. Mao, L. C. Ming, and M. H. Manghnani, Pressure-induced amorphization of crystalline silica, *Nature,* **334**, 52-54 (1988).
32. **Hemley, R. J.**, A. C. Lasaga, V. Vaida, and M. Karplus, Theoretical analysis of the $1^1B_u^+(^1B_1^+) \rightarrow 1^1A_g^-$ ($^1A_1^-$) transition of *trans* and *cis* 1,3,5-hexatriene, *J. Phys. Chem.,* **92**, 945-954 (1988).
33. **Hemley, R. J.** and H. K. Mao, Phase transition in solid molecular hydrogen at ultrahigh pressures, *Phys. Rev. Lett.,* **61**, 857-860 (1988).
34. **Hemley, R. J.**, P. F. McMillan, and G. H. Wolf, Optical spectroscopic techniques, in *Frontiers in Mineral Physics, Report of the Mineral Physics Committee of the American Geophysical Union, Chapter 13, Lake Arrowhead, CA* (eds. W. A. Bassett, Mackwell, S. J. and McMillan, P. F.), 51-99 (American Geophysical Union, 1988).
35. **Hemley, R. J.** and R. F. Porter, Raman spectroscopy at ultrahigh pressures, *Scripta Metallurgica,* **22**, 139-144 (1988).
36. Jephcoat, A. P., **R. J. Hemley**, and H. K. Mao, X-ray diffraction of Cr^{+3}:Al_2O_3 to 175 GPa, *Physica B,* **150**, 115-121 (1988).
37. Jephcoat, A. P., **R. J. Hemley**, H. K. Mao, R. E. Cohen, and M. J. Mehl, Raman spectroscopy and theoretical modelling of BeO at high pressure, *Phys. Rev. B,* **37**, 4727-4734 (1988).
38. Kubicki, J. D. and **R. J. Hemley**, *In-situ* high-pressure Raman spectra of silicate glasses, *Ann. Report Director Geophys. Lab. 1987-1988,* (1988).
39. Mao, H. K., **R. J. Hemley**, Y. Wu, A. P. Jephcoat, L. W. Finger, C. S. Zha, and W. A. Bassett, High-pressure phase diagram and equation of state of solid helium from single-crystal x-ray diffraction to 23.3 GPa, *Phys. Rev. Lett.,* **60**, 2649-2652 (1988).
40. Mao, H. K., A. P. Jephcoat, **R. J. Hemley**, L. W. Finger, C. S. Zha, R. M. Hazen, and D. E. Cox, Synchrotron x-ray diffraction measurements of single-crystal hydrogen to 26.5 GPa, *Science,* **239**, 1131-1134 (1988).

41. Stevenson, D. J., **R. J. Hemley**, and E. Knittle, Metallization of non-conductors, in *Frontiers in Mineral Physics, Report of the Mineral Physics Committee of the American Geophysical Union, Chapter 22, Lake Arrowhead, CA* (eds. W. A. Bassett, Mackwell, S. J. and McMillan, P. F.), 97-99 (American Geophysical Union, Washington, D.C., 1988).

1989

42. Chen, L. C., H. K. Mao, and **R. J. Hemley**, Compression and polymorphism of $CaSiO_3$ at high pressures and temperatures, *Ann. Report Director Geophys. Lab.,* **1988-1989**, 94-98 (1989).
43. Finger, L. W., R. M. Hazen, and **R. J. Hemley**, $BaCuSi_2O_6$: A new cyclosilicate with four-membered tetrahedral rings, *Am. Mineral.,* **74**, 952-955 (1989).
44. Finger, L. W., J. Ko, R. M. Hazen, T. Gasparik, **R. J. Hemley**, C. T. Prewitt, and D. J. Weidner, Crystal chemistry of phase B and an anhydrous analogue: implications for water storage in the upper mantle, *Nature,* **341**, 140-142 (1989).
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