

Steven D. Jacobsen

Department of Earth and Planetary Sciences

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*Curriculum Vitae
and List of Publications*

November, 2017

Education

Ph.D. Geophysics, University of Colorado, Boulder, 2001

M.S. Geology, University of Colorado, Boulder, 1998

B.A. Geology, Magna Cum Laude, minor **Mathematics**, University of Colorado, 1995

Positions Held

Professor (2016-present) Department of Earth and Planetary Sciences, Northwestern University

Faculty Member, Graduate Program in Applied Physics, Northwestern University

Associate, Center for Interdisciplinary Exploration and Research in Astrophysics

Associate Professor (2011–2016) Department of Earth and Planetary Sciences, Northwestern

Assistant Professor (2006–2011) Department of Earth and Planetary Sciences, Northwestern

Research Scientist, Principal Investigator (2005–2006)

Carnegie Institution of Washington, Geophysical Laboratory, Washington D.C.

Barbara McClintock Fellow, Postdoctoral Research Associate (2004–2005)

Carnegie Institution of Washington, Geophysical Laboratory, Washington D.C.

Alexander von Humboldt Fellow, Postdoctoral Research Associate (2001–2003)

Bayerisches Geoinstitut, University of Bayreuth, Germany

CIRES Graduate Research Fellow (1999–2000)

Cooperative Institute for Research in Environmental Sciences, University of Colorado

Graduate Research Assistant (1995–2001)

University of Colorado, Department of Geological Sciences

Research Assistant (1994–1995)

United States Geological Survey, National Ice Core Laboratory, Lakewood, Colorado

Research Assistant (1994 and 1997)

University of Nevada, Reno, Desert Research Institute, National Ice Core Laboratory

Research Statement

I study the physics and chemistry of minerals, glasses and melts in various applications to Earth and planetary science, chemistry, and materials science. In mineral physics, I use information about the composition, structure, and physical properties of materials to understand geophysical processes, geochemical cycling, and to investigate potentially useful properties of minerals and new materials for societal applications. I am especially interested in the origin and distribution of water in the Earth. In chemistry and materials science, I use extreme conditions of pressure and temperature to explore new phase space in the design and synthesis of functional materials such as superhard ceramics. I am also interested in science policy and outreach at all levels.

Awards and Fellowships

Friedrich Wilhelm Bessel Research Award

Alexander von Humboldt Foundation, 2014

Weinberg College Distinguished Teaching Award

Northwestern University, Weinberg College of Arts and Sciences, 2013

Presidential Early Career Award for Scientists and Engineers (PECASE, 2008)

White House Office of Science and Technology Policy

Citation: *For innovative experimental research to elucidate the critical role of water on the physical properties of the Earth's deep interior. Further recognition for prioritizing science education at all levels and proactively working to close the minority achievement gap in science and mathematics*

Packard Fellowship for Science and Engineering

David and Lucile Packard Foundation, 2008-2012

Faculty Early Career Development Award (CAREER)

National Science Foundation, 2008-2012

Mineralogical Society of America Distinguished Lecturer

Mineralogical Society of America, 2007-2008

Barbara McClintock Postdoctoral Fellowship

Carnegie Institution of Washington, 2005-2006

Alexander von Humboldt Fellowship

Bayerisches Geoinstitut, University of Bayreuth, Germany, 2002-2003

E.H. Kraus Grant for Research in Crystallography

Mineralogical Society of America, 2001

Excellence in Trades Award

University of Colorado, Department of Physics, 2001

Mineral and Rock Physics Graduate Research Award

American Geophysical Union, 2000

Longley, Wahlstrom, Warner Award

University of Colorado, Department of Geological Sciences, 2000

CIRES Graduate Research Fellowship

Cooperative Institute for Research in Environmental Sciences, Univ. of Colorado, 1999

Patents

Title: **Optical Contact Micrometer**

Patent number: 8,810,904

Filing date: 02/09/2012; Awarded 08/19/2014.

The optical contact micrometer consists of a double-contact micrometer interfaced with an optical heterodyne interferometer to achieve high-spatial resolution, high-precision sample thickness measurements for a variety of material physical properties measurements such as infrared spectroscopy and ultrasonic interferometry. With spherical contact lenses of 5 mm diameter, the spatial resolution is on the order of 50 micrometers, and by interfacing the instrument with any commercially available heterodyne interferometer, sample thickness can be determined with $\pm 0.05 \mu\text{m}$ total experimental uncertainty. Examples include application to determining elastic properties of diamond and related superhard materials.

Funding and Research Awards

National Science Foundation (DMR-Ceramics)	\$298,701
<i>“Hardness and Elastic Properties of Superhard and Ultrahard Materials”</i>	
PI (co-PI, C.R. Bina) award dates: 07/2015-06/2017	
National Science Foundation (EAR-Geophysics)	\$343,479
<i>“Hydration State of the Transition Zone and Lowermost Mantle”</i>	
PI, award dates: 01/2015-01/2018	
DOE/NNSA, Carnegie/DOE Alliance Center (CDAC), Partner Inst. Sub-award	\$428,066
SSAA Program of the National Nuclear Security Administration	
<i>“High-pressure elastic properties of minerals, glasses, and superhard materials”</i>	
PI, award dates: 03/2013-02/2018	
David and Lucile Packard Fellowship for Science and Engineering	\$875,000
<i>“Elastic properties of superhard materials using gigahertz-ultrasound”</i>	
PI, award dates: 11/2008-11/2013 (extended to 11/2017)	
National Science Foundation (CAREER EAR-0748707)	\$509,328
<i>“Effects of hydration on the physical properties of mantle materials from atomic to geophysical scales.”</i> With PECASE. PI, award dates: 01/2008-12/2013	
DOE/NNSA, Carnegie/DOE Alliance Center (CDAC), Partner Inst. Sub-award	\$274,147
SSAA Program of the National Nuclear Security Administration	
<i>“Elasticity of superhard materials using GHz-ultrasonic interferometry”.</i>	
PI, award dates: 03/2008-02/2013	
National Science Foundation (EAR-0948953) Instrumentation and Facilities	\$176,155
<i>“Acquisition of a Single-Crystal X-ray Diffractometer for Earth and Planetary Materials Research and Education at Northwestern University”.</i> PI, award dates: 11/2010-10/2011	
National Science Foundation (EAR-0651173) Instrumentation and Facilities	\$58,275
<i>“Acquisition of a broadband oscilloscope for GHz-ultrasonic studies of mineral elasticity in the diamond anvil cell”.</i> PI, award dates: 02/2007-2/2008	
National Science Foundation (EAR-0440112/EAR-0721449) Geophysics Program	\$298,671
<i>“High P-T elasticity of deep Earth materials with new Gigahertz-ultrasonic techniques”</i>	
PI (co-PI, R.J. Hemley), award dates: 12/2004-12/2008	
<i>Internal grants:</i>	
Northwestern University, Innovative Initiatives Incubator (I3) Grant	\$240,000
<i>“Charting high-pressure phase space for undiscovered magnetic materials”</i>	
Danna Freedman (PI), Steve Jacobsen (co-PI), Christopher Wolverton (co-PI)	
Award dates: 09/2016-08/2018 (\$73k to Jacobsen)	
Northwestern University, Data Science Research Grant	\$50,000
<i>“High-pressure materials design and discovery using big quantum data”</i>	
Christopher Wolverton (PI), Steve Jacobsen (co-PI), Award date: 09/2016	
Northwestern University, Weinberg College of Arts and Sciences, Hewlett Grant	\$34,374
<i>“Establishment of an Earth and Planetary Materials Undergraduate Teaching Laboratory.”</i> PI, Award date: 09/2006	
Northwestern University, Weinberg College of Arts and Sciences, Hewlett Grant	\$5,639
<i>“Modernization of Northwestern’s rock and mineral collection in support of innovative undergraduate education and public outreach.”</i> PI, Award date: 06/2010	

Committee Membership

- Member*, Committee on Seismology and Geodynamics, 2015-present
National Academy of Sciences
- Member*, Executive Committee of COMPRES, 2015-present
NSF-Consortium for Materials Properties Research in Earth Sciences (COMPRES)
- Member*, DOE Beamline Advisory Team (BAT) NSLS-II FIS/MET beamline, 2015-present
National Synchrotron Light Source-II (NSLS-II)
- Member*, Advisory Committee, J.B. Cohen X-ray Diffraction Laboratory, 2016-present
Department of Materials Science and Engineering, Northwestern University
- Member*, Curricular Policy Committee, Weinberg College of Arts and Sciences, 2016-present
- Member*, Review Panel, NSF Geophysics Program Postdoctoral Fellowships, 2014
- Member*, Laser Safety Committee, Northwestern University, 2008-2014
- Elector*, Northwestern University Institutional Representative to NSF-COMPRES, 2006-present
- Member*, Administrative Board of The Graduate School, Northwestern, 2012-present
- Member*, COMPRES Nominations Committee, 2011-2012
- Member*, Education, Outreach and Infrastructure Development Committee, 2008-2014
- Member*, Ad hoc Committee on Education and Outreach for COMPRES, 2012-2013
- Member*, NSLS-II beamline development proposal team, 2009-2011
Title: Frontier Synchrotron Infrared Spectroscopy Under Extreme Conditions
Awarded NxtGen beamline development status from DOE, May, 2012
- Director of Computing*, NU Dept. Earth and Planetary Sciences, 2008-2012
- Member*, Mineral and Rock Physics Executive Committee, AGU, 2004-2010
- Member*, Mineral and Rock Physics Graduate Research Award Committee, AGU, 2006-2010
- Chair*, Mineral and Rock Physics Graduate Research Award Committee, AGU, 2007-2008
- Member*, Space Planning Committee, NU Dept. Earth and Planetary Sciences, 2008-2012
- Member*, Program Committee Annual COMPRES meeting, 2008-2010
- Member*, Geophysics Review Panel, NSF, Division of Earth Sciences, 2007
- Member*, Program Committee, American Geophysical Union, 2004-2005

Editorship, and Outreach

- Associate Editor*, Geophysical Research Letters, May 2012-present
- Associate Master*, Public Affairs Residential College, Northwestern University, 2009-2014
- Project Excite*, Earth science education courses for Evanston district 65 3rd&4th graders
Northwestern University, Center for Talent Development, 2006-present
- Assistant Coordinator*, NSF-REU Summer Scholar Program, Carnegie Institution, 2004-2006
- Editor*, AGU Monograph, "Earth's Deep Water Cycle" (with S. van der Lee), 2006
- Guest Editor*, *Journal of Synchrotron Radiation*: Structure determination by single-crystal X-ray diffraction at Megabar pressures (with P. Dera and C.T. Prewitt), Volume 12, 2005

Teaching

EARTH-101: Northwestern University, *Earth Science for the 21st Century*
EARTH-102: Northwestern University, *The Future of Renewable Energy*
EARTH-300: Northwestern University, *Earth and Planetary Materials*
EARTH-301: Northwestern University, *Petrology: Evolution of crustal and mantle rocks*
EARTH-438: Northwestern University, *Water in the Solar System*
EARTH-438: Northwestern University, *Mineral Physics*
EARTH-440: Northwestern University, *Metamorphic and Sedimentary Petrology*

Advisors

B.A./M.S. University of Colorado at Boulder: **Joseph R. Smyth**
Ph.D., University of Colorado at Boulder: **Hartmut A. Spetzler** and **Joseph R. Smyth**
Postdoctoral research at Bayerisches Geoinstitut: **Stephen J. Mackwell**
Postdoctoral research at the Geophysical Laboratory: **Russell J. Hemley**

Advisees

Current Postdocs:

Alisha Clark, Northwestern University (NSF-Postdoctoral Fellow)
Publications: [76], [90]
James Walsh, Northwestern University, Chemistry, *co-supervisor* (with Danna Freedman)
Publications: [85]

Former Postdocs:

Christopher M. Holl, Northwestern University, 2006-2009, *supervisor*
Publications: [44], [45], [46], [48], [49], [50], [55]
Xiaobing Liu, Northwestern University, EPS, *co-supervisor* (with Craig Bina)
Publications: [89], [93]
Sylvia-Monique Thomas, Northwestern University, 2008-2010, *co-supervisor* (with C. Bina)
Publications: [62], [63], [66], [72], [79], [80], [81]

Current Graduate Students:

Hannah Bausch, Northwestern University, Ph.D. student, *supervisor*
Samantha Clarke, Northwestern University, Ph.D. student (Chemistry), *co-supervisor* (with Danna Freedman)
Wang Fei, Northwestern University, M.S. student, *supervisor*
Phylindia Gant, Northwestern University, Ph.D. student, *supervisor*
John Lazarz, Northwestern University, Ph.D. student, *supervisor*
Publications: [79]
Sheel Sanghvi, Northwestern University, Ph.D. student (Materials Science), *co-supervisor* (with Sosina Haile)
Michelle Wenz, Northwestern University, Ph.D. student, *supervisor*

Former Graduate Students:

- Laurel Childress, Northwestern University, Ph.D. 2016, *co-supervisor* (with N. Blair)
Publications: [92]
Now at: Postdoc, Woods Hole Oceanographic Institute, MA
- Alisha Clark, UC-Davis, Ph.D. 2015, *co-supervisor* (with Chip Lesher, UC-Davis)
Publications: [76], [90]
Now at: NSF-Postdoctoral Fellow, Northwestern University
- Fei Qin, Northwestern University, Visiting Scholar (Chinese Scholarship Program), *supervisor*
Publications: [87], [91]
Now at: Peking University, Key Laboratory of Orogenic Belts and Crustal Evolution
- Joshua Townsend, Northwestern University Presidential Fellow, Ph.D. 2016, *supervisor*
Publications: [62], [67], [70], [78], [86], [88]
Now at: Postdoc at Sandia National Laboratory
- Yun-Yuan Chang, Northwestern University, Ph.D. 2014, *supervisor*
Publications: [59], [62], [64], [67], [70], [72], [75], [81], [91]
Now at: Postdoctoral Fellow, Institution of Earth Sciences, Academia Sinica, Taiwan
- Anastasia Kantor, Bayerisches Geoinstitut, Ph.D. 2008, *co-supervisor* (with L. Dubrovinsky)
Publications: [16], [24], [47]
Now at: European Synchrotron Radiation Facility, Grenoble, France
- Xiaoting Lou, Northwestern University, Ph.D. 2013, *co-supervisor* (with S. van der Lee)
Publications: [70]
Now at: Geophysicist at Chevron
- Zhu Mao, Princeton University, Ph.D. 2009 *co-supervisor* (with T. Duffy)
Publications: [45], [46], [48], [55], [56], [60], [64], [77]
Now at: Professor, University of Science and Technology of China (USTC)
- Diane Wetzel, Brown University, Ph.D. 2014, *co-supervisor* (with Alberto Saal)
Publications: [69]
Now at: Geologist at Anadarko Petroleum Corporation

Former Undergraduate Research Assistants:

- Ari Melinger-Cohen, Northwestern, B.A. Honors Thesis 2013, *co-supervisor* (with C. Bina)
Now at: Graduate student at UC-Berkeley
- Julia Swanson, Northwestern University (EPS), B.A.
Publications: [65]
Now at: Deckhand/Educator aboard Schooner Sultana
- Rebecca Fischer, Northwestern University (ISP), B.A. 2009, *supervisor*
Publications: [49]
Now at: Assistant Professor at Harvard
- Ben Haugen, Carnegie Institution REU Program 2008, *co-supervisor* (with A. Goncharov)
Publications: [51], [54]
Now at: Sr. Geotechnical Solutions Engineer with Maptek.
- Elizabeth Littlefield, Carnegie Institution REU Program 2008, *supervisor*
Publications: [57]
Now at: Research Scientist at Great Basin Center for Geothermal Energy

Invited Talks

Jackson School of Geosciences, UT-Austin, DeFord Lecture, 9/14/17
Z Fundamental Science Program (ZFSP) Workshop, Sandia National Laboratory, 07/17/17
Université Pierre et Marie Curie, IMPMC, 03/06/2017
University of New Mexico, Department of Earth and Planetary Sciences, 10/28/2016
Center for Interdisciplinary Exploration and Research in Astrophysics, 10/10/2016
Purdue University, Department of Earth, Atmospheric, and Planetary Sciences, 2/19/2016
University of Western Ontario, Department of Earth Sciences, 2/7/16
Advanced Photon Source, Argonne National Laboratory, 12/9/15
NNSA/DOE site visit and review of Carnegie/DOE Alliance Center (CDAC)
University of Vienna, Institute for Mineralogy and Crystallography, Austria, 5/22/2015
Goethe University, Institut für Geowissenschaften, Frankfurt, Germany, 4/22/2015
Observatoire de Physique du Globe, University of Clermont-Ferrand, France, 3/6/2015
University College London, Department of Earth Sciences, 2/4/2015
Bayerisches Geoinstitut, University of Bayreuth, Germany, 9/18/2014
Northwestern University, Department of Physics and Astronomy, 11/1/2013
Andor Academy Workshop, NUANCE-Northwestern University, Keynote talk, 10/16/2013
Brown University, Department of Geological Sciences, 10/10/2013
Advanced Photon Source, Argonne National Laboratory, 9/16/2013
NNSA site visit and review of Carnegie/DOE Alliance Center (CDAC)
David and Lucile Packard Foundation, 25th Anniversary Reunion, Denver, 9/13/2013
Gordon Research Conference on Interior of the Earth, Mount Holyoke College, 6/6/2013
University of Colorado, Department of Physics, 4/8/2013
Cornell University, Department of Earth and Atmospheric Sciences, 5/2/2012
National Synchrotron Light Source, Brookhaven National Laboratory, 11/16/2011
NSF site visit: Consortium for Materials Properties Research in Earth Sciences (COMPRES)
Advanced Photon Source, Argonne National Laboratory, 10/25/2011
NNSA site visit and review of Carnegie/DOE Alliance Center (CDAC)
Northern Illinois University, Department of Geology and Environmental Sciences, 4/29/2011
University of Denver, Department of Geography, 11/18/2010
University of Denver, Department of Physics and Astronomy, 11/17/2010
Geophysical Laboratory, Carnegie Institution of Washington, 1/12/2010
Advanced Photon Source, Argonne National Laboratory, High-pressure seminar, 11/10/2009
Washington University, St. Louis, Department of Earth and Planetary Sciences, 10/8/2009
David and Lucile Packard Foundation, Packard Fellows Meeting, Monterey, CA, 9/10/2009
Cooperative Institute for Deep Earth Research, Keynote, Planning Workshop, 5/19/2009
Ehime University, Geodynamics Research Center, Matsuyama, Japan, 3/3/2009
Northwestern University, Department of Physics and Astronomy, 5/23/2008
University of Munich, Department of Earth and Environmental Sciences, Germany, 3/7/2008
University of Neuchâtel, Institute of Geology and Hydrogeology, Switzerland, 3/5/2008
University of Bristol, Department of Earth Sciences, Bristol, U.K., 3/3/2008
North Dakota State University, Department of Geosciences, 1/24/2008
North Dakota State University, Department of Civil Engineering, 1/24/2008
University of North Dakota, Department of Geology and Geological Engineering, 1/23/2008

Winona State University, Department of Geosciences, 1/21/2008
Northwestern University, Department of Materials Science and Engineering, 5/15/2007
West Virginia University, Department of Geology and Geography, 9/10/2007
Rutgers University, Department of Earth and Planetary Sciences, 9/12/2007
Memorial University, Department of Earth and Planetary Sciences, Newfoundland, 9/14/2007
University of Illinois at Urbana-Champaign, Department of Geology, 2/9/2007
University of Chicago, Department of Geophysical Sciences, 10/20/2006
University of Illinois Chicago, Department of Earth and Environmental Sciences, 9/7/2006
University of Minnesota, Department of Geology and Geophysics, 3/2/2006
Virginia Tech, Department of Geological Sciences, 2/23/2006
Yale University, Department of Geology and Geophysics, 1/20/2006
Bayerisches Geoinstitut, University of Bayreuth, Germany, 10/17/2005
Tohoku University, Sendai Japan, Graduate School of Science, 7/22/2005
Northwestern University, Department of Geological Sciences, 4/15/2005
Princeton University, Department of Geosciences, 4/7/2005
University of Wisconsin, Madison, Department of Geology and Geophysics, 3/22/2004
Bayerisches Geoinstitut, Bayreuth, Germany, 6/26/2003
California Institute of Technology, Seismological Laboratory, Pasadena, California, 4/14/2003
Bavarian Academy of Science, Munich, Germany, 11/14/2002
Peking University, Department of Geological Sciences, Beijing, China, 7/16/2001

Work in Progress

Dalou, C., C.L. Losq, C. Glein, M. Hirschmann and **S.D. Jacobsen** (in prep) Evolution of reduced C-O-H-N volatile species outgassed from the Hadean magma ocean.

Chang, Y.Y., X. Liu, C.R. Bina, and **S.D. Jacobsen** (in prep) High-pressure compression of diamond-like superhard materials.

Jacobsen, S.D., J.R. Smyth, E.H. Hauri, M. Gutmann, and D.J. Frost, Hydrogen positions of hydrous wadsleyite.

Jacobsen, S.D., S.M. Thomas, D.T. Wetzell, E. Hauri, A. Saal, and M. Rutherford (in prep) Speciation of hydrogen in Apollo 15 basaltic lunar glasses.

Lazarz, J.D., P. Dera, C.R. Bina, Y. Meng, and **S.D. Jacobsen** (in prep) Compression mechanisms of low-clinoenstatite.

Lazarz, J.D., K.J. Ramos, C.A. Bolme, and **S.D. Jacobsen** (in prep) Optical properties of monoclinic acetaminophen, in preparation.

Liu, X., Y.Y. Chang, S.N. Tkachev, J.S. Wu, C.R. Bina, and **S.D. Jacobsen** (in prep) Ultrahard single-crystal BC₄N, in preparation.

Liu, X., S.M. Clarke, D.E. Freedman, S. Petitgirard, C.R. Bina, and **S.D. Jacobsen** (in prep) Origin of superconductivity in heavily boron-doped diamond.

Liu, X., D.J. Frost, S. Petitgirard, C.R. Bina, and **S.D. Jacobsen** (in prep) HPHT synthesis of nano-twinned diamond.

Thomas, S.M., **S.D. Jacobsen**, C.R. Bina, Z. Liu, Y. Ye, and J.R. Smyth, High-pressure FTIR spectroscopy of iron- and aluminum-bearing phase D, in preparation.

List of Publications: Steven D. Jacobsen

Updated October, 2017
ORCID 0000-0002-9746-958X
Sum of citations: 3477; *h*-index: 35

Journal Publications

2017, and articles submitted or in press

- [98] Childress, L.B. and **S.D. Jacobsen** (2017) High-pressure high-temperature Raman spectroscopy of kerogen: relevance to subducted organic carbon. *American Mineralogist* 102, 391-403.
- [97] Clarke, S.M., M. Amsler, J.P.S. Walsh, T. Yu, Y. Wang, Y. Meng, **S.D. Jacobsen**, C. Wolverton, and D.E. Freedman (2017) Creating binary Cu-Bi compounds via high-pressure synthesis: A combined experimental and theoretical study. *Chemistry of Materials* 29, 5276-5285.
- [96] Faber, K.T. et al. [43 co-authors] (2017) The role of ceramic and glass science research in meeting societal challenges: Report from an NSF-sponsored workshop. *Journal of the American Ceramic Society*, 1-27, doi: 10.1111/jace.14881.
- [95] Klein, R.A., J.P.S. Walsh, S.M. Clarke, W. Bi, E.E. Alp, **S.D. Jacobsen**, and D.E. Freedman. An $S = \frac{1}{2}$ kagomé lattice realized via pressure-induced spin crossover in jarosite. Submitted to *Nature Chemistry*.
- [94] Liu, X., Y.Y. Chang, S.N. Tkachev, C.R. Bina, and **S.D. Jacobsen** (2017) Elastic and mechanical softening in boron-doped diamond. *Scientific Reports* 7, 42921.
- [93] Liu, X., X. Chen, X. Jia, H.A. Ma, D.J. Singh, R. Stern, J. Wu, S. Petitgirard, C.R. Bina, and **S.D. Jacobsen** (2017) Shallow donor state of boron-oxygen complex in diamond: A route to n-type semiconducting diamond. Submitted to *Nature Materials*.
- [92] Powderly, K.M., S.M. Clarke, M. Amsler, C. Wolverton, C.D. Malliakas, Y. Meng, **S.D. Jacobsen**, and D.E. Freedman (2017) High-pressure discovery of β -NiBi. *Chemical Communications* 53, 11241-11244.
- [91] Qin, F., X. Wu, D. Zhang, S. Qin, and **S.D. Jacobsen** (submitted) Thermal equation of state of natural Ti-bearing clinohumite. Submitted to *Journal of Geophysical Research*.

2016

- [90] Clark, A.N., C.E. Leshner, **S.D. Jacobsen**, and Y. Wang (2016) Anomalous density and elastic properties of basalt at high pressure: reevaluating the effect of melt fraction on seismic velocity in the Earth's crust and upper mantle. *Journal of Geophysical Research* 121, doi: 10.1002/2016JB012973.
- [89] Liu, X., X. Chen, H.A. Ma, X. Jia, J. Wu, T. Yu, Y. Wang, J. Guo, S. Petitgirard, C.R. Bina, and **S.D. Jacobsen** (2016) Ultrahard stitching of nanotwinned diamond and cubic boron nitride in C₂-BN composite. *Scientific Reports* 6, 30518.
- [88] Palot, M., **S.D. Jacobsen**, J.P. Townsend, F. Nestola, K. Marquardt, N. Miyajima, J.W. Harris, T. Stachel, C.A. McCammon, and D.G. Pearson (2016) Evidence for H₂O-bearing fluids in the lower mantle from diamond inclusion. *Lithos* 265, 237-243.

- [87] Qin, F., X. Wu, Y. Wang, D. Fan, S. Qin, K. Yang, and **S.D. Jacobsen** (2016) High-pressure behavior of natural single-crystal epidote and clinozoisite up to 40 GPa. *Physics and Chemistry of Minerals* 43, 649-659.
- [86] Townsend, J.P., J. Tsuchiya, C.R. Bina, and **S.D. Jacobsen** (2016) Water partitioning between bridgmanite and postperovskite in the lowermost mantle. *Earth and Planetary Science Letters* 454, 20-27.
- [85] Walsh, J.P.S., S.M. Clarke, Y. Meng, **S.D. Jacobsen**, and D.E. Freedman (2016) Discovery of FeBi₂. *ACS Central Science* 2, 867-871.
- [84] Yang, J., J.F. Lin, **S.D. Jacobsen**, S.N. Tkachev, and V.B. Prakapenka (2016) Elasticity of ferropericlase and seismic heterogeneity in the Earth's lower mantle. *Journal of Geophysical Research* 121, doi: 10.1002/2016JB013352.
- [83] Zhang, L., J.R. Smyth, J. Allaz, T. Kawazoe, **S.D. Jacobsen**, and Z. Jin (2016) Transition metals in the transition zone: crystal chemistry of minor element substitution in wadsleyite. *American Mineralogist* 101, 2232-2330.

2015

- [82] Armstrong, L.S., M.M. Hirschmann, B.D. Stanley, E.G. Falksen, and **S.D. Jacobsen** (2015) Speciation and solubility of reduced C-O-H-N volatiles in mafic melt: Implications for volcanism, atmospheric evolution, and deep volatile cycles in the terrestrial planets. *Geochimica et Cosmochimica Acta* 171, 283-302.
- [81] Chang, Y.Y., **S.D. Jacobsen**, C.R. Bina, S.M. Thomas, J.R. Smyth, D.J. Frost, T.B. Ballaran, C.A. McCammon, E.H. Hauri, T. Inoue, H. Yurimoto, Y. Meng, and P. Dera (2015) Comparative compressibility of hydrous wadsleyite and ringwoodite: Effect of H₂O and implications for detecting water in the transition zone. *Journal of Geophysical Research* 120, doi: 10.1002/2015JB012123.
- [80] Thomas, S.M., **S.D. Jacobsen**, C.R. Bina, P. Reichart, M. Moser, E.H. Hauri, M. Koch-Müller, J.R. Smyth, and G. Dollinger (2015) Quantification of water in hydrous ringwoodite. *Frontiers in Earth Science* 2, 38, doi: 10.3389/feart.2014.00038.
- [79] Thomas, S.M., K. Wilson, M. Koch-Müller, E.H. Hauri, C. McCammon, **S.D. Jacobsen**, J. Lazarz, D. Rhede, M. Ren, N. Blair, and S. Lenz (2015) Quantification of water in majoritic garnet. *American Mineralogist* 100, 1084-1092.
- [78] Townsend, J.P., J. Tsuchiya, C.R. Bina, and **S.D. Jacobsen** (2015) First-principles investigation of hydrous post-perovskite. *Physics of the Earth and Planetary Interiors* 244, 42-48.
- [77] Ye, Y., **S.D. Jacobsen**, Z. Mao, T.S. Duffy, S.M. Hirner, and J.R. Smyth (2015) Crystal structure, thermal expansivity and elasticity of OH-chondrodite: Trends among dense hydrous magnesium silicates. *Contributions to Mineralogy and Petrology* 169, 43.

2014

- [76] Clark, A.N., C.E. Lesher, **S.D. Jacobsen**, and S. Sen (2014). Mechanisms of anomalous compressibility of vitreous silica. *Physical Review B* 90, 174110.

- [75] Chang, Y.Y., **S.D. Jacobsen**, M. Kimura, T. Irifune, and I. Ohno (2014) Elastic properties of transparent nano-polycrystalline diamond measured by GHz-ultrasonic interferometry and resonant sphere methods. *Physics of the Earth and Planetary Interiors* 228, 47-55.
- [74] Gatta, G.D., **S.D. Jacobsen**, P. Vignola, G.J. McIntyre, G. Guastella, and L.F. Abate (2014) Single-crystal neutron diffraction and Raman spectroscopic study of hydroxylherderite, $\text{CaBePO}_4(\text{OH},\text{F})$. *Mineralogical Magazine* 78, 723-737.
- [73] Schmandt, B., **S.D. Jacobsen**, T.W. Becker, Z. Liu, and K.G. Dueker (2014) Dehydration melting at the top of the lower mantle. *Science* 344, 1265-1268.

2013

- [72] Chang, Y.Y., **S.D. Jacobsen**, J.F. Lin, C.R. Bina, S.M. Thomas, J. Wu, G. Shen, Y. Xiao, P. Chow, D.J. Frost, C.A. McCammon, and P. Dera (2013) Spin transition of Fe^{3+} in Al-bearing phase D: an alternative explanation for small-scale seismic scatterers in the mid-lower mantle. *Earth and Planetary Science Letters* 382, 1-9.
- [71] Reichmann, H.J., **S.D. Jacobsen**, and T.B. Ballaran (2013) Elasticity of franklinite and trends for transition-metal oxide spinels. *American Mineralogist* 98, 601-608.
- [70] Townsend, J.P., Y.Y. Chang, X. Lou, M. Merino, S.J. Kirklin, J.W. Doak, A. Issa, C. Wolverton, S.N. Tkachev, P. Dera, and **S.D. Jacobsen** (2013) Stability and equation of state of post-aragonite BaCO_3 . *Physics and Chemistry of Minerals* 40, 447-453.
- [69] Wetzel, D.T., M.J. Rutherford, **S.D. Jacobsen**, E.H. Hauri, and A.E. Saal (2013) Degassing of reduced carbon from planetary basalts. *Proceedings of the National Academy of Sciences USA* 110, 8010-8013.
- [68] Ye, Y., J.R. Smyth, **S.D. Jacobsen**, and C. Goujon (2013) Crystal chemistry, thermal expansion, and Raman spectra of hydroxyl-clinohumite: implications for water in Earth's interior. *Contributions to Mineralogy and Petrology* 165, 563-574.
- [67] Ye, Y., J.R. Smyth, **S.D. Jacobsen**, W.R. Panero, D.A. Brown, T. Katsura, Y.Y. Chang, J.P. Townsend, P. Dera, S. Tkachev, C. Unterborn, Z. Liu, and C. Goujon (2013) Crystal structure, Raman and FTIR spectroscopy, and equations of state of OH-bearing MgSiO_3 akimotoite. *Contributions to Mineralogy and Petrology* 166, 1375-1388.

2012

- [66] Adams, K.A., **S.D. Jacobsen**, Z. Liu, S.M. Thomas, M. Somayazulu, and D.M. Jurdy (2012) Optical reflectivity of solid and liquid methane: application to spectroscopy of Titan's hydrocarbon lakes. *Geophysical Research Letters* 39, L04309.
- [65] Gatta, G.D., G.J. McIntyre, J.G. Swanson, and **S.D. Jacobsen** (2012) Minerals in cement chemistry: a single-crystal neutron diffraction and Raman spectroscopic study of thaumasite, $\text{Ca}_3\text{Si}(\text{OH})_6(\text{CO}_3)(\text{SO}_4)12\text{H}_2\text{O}$. *American Mineralogist* 97, 1060-1069.
- [64] Mao, Z., J.F. Lin, **S.D. Jacobsen**, T.S. Duffy, Y.Y. Chang, J.R. Smyth, D.J. Frost, E.H. Hauri, and V.B. Prakapenka (2012) Sound velocities of hydrous ringwoodite to 16 GPa and 673 K. *Earth and Planetary Science Letters* 331-332, 112-119.
- [63] Thomas, S.M., C.R. Bina, **S.D. Jacobsen**, and A.F. Goncharov (2012) Radiative heat transfer in a hydrous mantle transition zone. *Earth and Planetary Science Letters* 357-358, 130-136.

- [62] Ye, Y., D.A. Brown, J.R. Smyth, W.R. Panero, **S.D. Jacobsen**, Y.Y. Chang, J.P. Townsend, S.M. Thomas, E.H. Hauri, P. Dera, and D.J. Frost (2012) Compressibility and thermal expansion of hydrous ringwoodite with 2.5(3) wt% H₂O. *American Mineralogist* 97, 573-582.

2011

- [61] Longo, M., C.A. McCammon, and **S.D. Jacobsen** (2011) Microanalysis of the iron oxidation state in (Mg,Fe)O and application to the study of microscale processes. *Contributions to Mineralogy and Petrology* 162, 1249-1257.
- [60] Mao, Z., **S.D. Jacobsen**, D.J. Frost, C.A. McCammon, E.H. Hauri, and T.S. Duffy (2011) Effect of hydration on the single-crystal elasticity of Fe-bearing wadsleyite to 12 GPa. *American Mineralogist* 96, 1606-1612.
- [59] Zhang, J.S., J.D. Bass, T. Taniguchi, A.F. Goncharov, Y.Y. Chang, and **S.D. Jacobsen** (2011) Elasticity of cubic boron nitride under ambient conditions. *Journal of Applied Physics* 109, 063521.

2010

- [58] Carpenter, M.A., S.V. Sinogeikin, J.D. Bass, D. Lakshmitov, and **S.D. Jacobsen** (2010) Elastic relaxations associated with the *Pm3m* – *R3c* transition in LaAlO₃ I: single crystal elastic constants at room temperature. *Journal of Physics: Condensed Matter* 22, 035403.
- [57] **Jacobsen, S.D.**, Z. Liu, T.B. Ballaran, E.F. Littlefield, L. Ehm, and R.J. Hemley (2010) Effect of H₂O on upper mantle phase transitions in MgSiO₃: is the depth of the seismic X-discontinuity an indicator of mantle water content? *Physics of the Earth and Planetary Interiors* 183, 234-244.
- [56] Lin, J.F., Z. Mao, I. Jarrige, Y. Xiao, P. Chow, T. Okuchi, N. Hiraoka, and **S.D. Jacobsen** (2010) Resonant X-ray emission study of the lower-mantle ferropericlasite at high pressures. *American Mineralogist* 95, 1125-1131.
- [55] Mao, Z., **S.D. Jacobsen**, F. Jiang, J.R. Smyth, C.M. Holl, D.J. Frost, and T.S. Duffy (2010) Velocity crossover between hydrous and anhydrous forsterite at high pressures. *Earth and Planetary Science Letters* 293, 250-258.

2009

- [54] Goncharov, A.F., P. Beck, V.V. Struzhkin, B.D. Haugen, and **S.D. Jacobsen** (2009) Thermal conductivity of lower mantle minerals. *Physics of the Earth and Planetary Interiors* 174, 24-32.
- [53] Lin, J.F., A.G. Gavriliuk, W. Sturhahn, **S.D. Jacobsen**, J. Zhao, M. Lerche, and M. Hu (2009) Synchrotron Mössbauer spectroscopic study of ferropericlasite at high pressures and temperatures. *American Mineralogist* 94, 594-599.

2008

- [52] Crowhurst, J.C., J.M. Brown, A.F. Goncharov, and **S.D. Jacobsen** (2008) Elasticity of (Mg,Fe)O through the spin transition of iron in the lower mantle. *Science* 319, 451-453.
- [51] Goncharov, A.F., B.D. Haugen, V.V. Struzhkin, P. Beck, and **S.D. Jacobsen** (2008) Radiative conductivity in the Earth's lower mantle. *Nature* 465, 231-234.

- [50] Holl, C.M., J.R. Smyth, **S.D. Jacobsen**, and D.J. Frost (2008) Effect of water on the structure and compressibility of wadsleyite, β -(Mg_2SiO_4). *American Mineralogist* 93, 598-607.
- [49] **Jacobsen, S.D.**, C.M. Holl, K.A. Adams, R.A. Fischer, E.S. Martin, C.R. Bina, J.F. Lin, V.B. Prakapenka, A. Kubo, and P. Dera (2008) Compression of single-crystal magnesium oxide to 118 GPa and a ruby pressure gauge for helium pressure media. *American Mineralogist* 93, 1823-1828.
- [48] **Jacobsen, S.D.**, F. Jiang, Z. Mao, T.S. Duffy, J.R. Smyth, C.M. Holl, and D.J. Frost (2008) Effects of hydration on the elastic properties of olivine. *Geophysical Research Letters* 35, L14303.
- [47] Kantor, A., I. Kantor, A. Kurnosov, L. Dubrovinsky, M. Krisch, A. Bossak, and **S. Jacobsen** (2008) Anelasticity of Fe_xO at high pressure. *Applied Physics Letters* 93, 034106.
- [46] Mao, Z., **S.D. Jacobsen**, F. Jiang, J.R. Smyth, C.M. Holl, and T.S. Duffy (2008) Elasticity of hydrous wadsleyite to 12 GPa: implications for Earth's transition zone. *Geophysical Research Letters* 35, L21305.
- [45] Mao, Z., **S.D. Jacobsen**, F. Jiang, J.R. Smyth, C.M. Holl, and T.S. Duffy (2008) Single-crystal elasticity of wadsleyites, β - Mg_2SiO_4 , containing 0.37-1.66 wt% water. *Earth and Planetary Science Letters* 268, 540-549.
- [44] Rivers, M., V.B. Prakapenka, A. Kubo, C. Pullins, C.M. Holl, and **S.D. Jacobsen** (2008) The COMPRES/GSECARS gas loading system for diamond anvil cells at the Advanced Photon Source. *High-Pressure Research* 28, 273-292.
- [43] Sun, T., P.B. Allen, D.G. Stahnke, **S.D. Jacobsen**, and C.C. Homes (2008) Infrared properties of ferropericlase ($\text{Mg}_{1-x}\text{Fe}_x$)O: Experiment and theory. *Physical Review B* 77, 134303.

2007

- [42] Angel, R.J., M. Bujak, J. Zhao, G.D. Gatta, and **S.D. Jacobsen** (2007) Effective hydrostatic limits of pressure media for high-pressure crystallographic studies. *Journal of Applied Crystallography* 40, 26-32.
- [41] Lin, J.F., **S.D. Jacobsen**, and R.M. Wentzcovitch (2007) Electronic spin transition of iron in the Earth's deep mantle. *Eos*, Vol 88, No 1, January 9 2007 issue, pp 13,17-18.
- [40] Lin, J.F., Vankó, G., **S.D. Jacobsen**, V. Iota, V.V. Struzhkin, V.B. Prakapenka, A. Kuznetsov, and C.S. Yoo (2007) Spin transition zone in Earth's lower mantle. *Science* 317, 1740-1743.
- [39] Litasov, K.D., E. Ohtani, H. Kagi, **S.D. Jacobsen**, S. Ghosh (2007) Temperature dependence and mechanisms of hydrogen incorporation in olivine at 12.5-14.0 GPa. *Geophysical Research Letters* 34, L16314.

2006

- [38] Demouchy, S., **S.D. Jacobsen**, F. Gaillard, and C.R. Stern (2006) Rapid magma ascent recorded by water diffusion profiles in mantle olivine. *Geology* 34, 429-432.
- [37] Goncharov, A.F., V.V. Struzhkin, and **S.D. Jacobsen** (2006) Reduced radiative conductivity of low-spin (Mg,Fe)O in the lower mantle. *Science* 312, 1205-1208.

- [36] Jackson, J.M., S.V. Sinogeikin, **S.D. Jacobsen**, H.J. Reichmann, S.J. Mackwell, and J.D. Bass (2006) Single-crystal elasticity and sound velocities of $(\text{Mg}_{0.94}\text{Fe}_{0.06})\text{O}$ ferropericlase to 20 GPa. *Journal of Geophysical Research* 111, B09203.
- [35] **Jacobsen, S.D.** (2006) Effect of water on the equation of state of nominally anhydrous minerals. In: H. Keppler and J.R. Smyth (Eds.) *Water in Nominally anhydrous minerals. Reviews in Mineralogy and Geochemistry* 62, 321-342.
- [34] **Jacobsen, S.D.** and J.R. Smyth (2006) Effect of water on the sound velocities of ringwoodite in the transition zone. In: S.D. Jacobsen and S. van der Lee (Eds.) *Earth's Deep Water Cycle*, American Geophysical Union, Geophysical Monograph 168, 131-145.
- [33] Lin, J.F., A.G. Gavriliuk, V.V. Struzhkin, **S.D. Jacobsen**, W. Sturhahn, M.Y. Hu, P. Chow, C.S. Yoo (2006) Pressure-induced electronic spin transition of iron in magnesiowüstite- $(\text{Mg,Fe})\text{O}$. *Physical Review B* 73, 113107.
- [32] Lin, J.F., **S.D. Jacobsen**, W. Sturhahn, J.M. Jackson, J. Zhao, and C.-S. Yoo (2006) Sound velocities of ferropericlase in the Earth's lower mantle. *Geophysical Research Letters* 33, L22304.
- [31] Reichmann, H.J. and **S.D. Jacobsen** (2006) Sound velocities and elastic constants of ZnAl_2O_4 spinel and implications for spinel-elasticity systematics. *American Mineralogist*, 91 1049-1054.
- [30] Schlegel, M.L., K.L. Nagy, P. Fenter, L. Cheng, N.C. Sturchio, **S.D. Jacobsen** (2006) Cation sorption on the muscovite (001) surface in chloride solutions using high-resolution X-ray reflectivity. *Geochimica et Cosmochimica Acta* 70, 3549-3565.
- [29] Smyth, J.R. and **S.D. Jacobsen** (2006) Nominally anhydrous minerals and Earth's deep water cycle. In: S.D. Jacobsen and S. van der Lee (Eds.) *Earth's Deep Water Cycle*, American Geophysical Union, Geophysical Monograph 168, 1-11.
- [28] Vanpeteghem, C.B., R.J. Angel, N.L. Ross, **S.D. Jacobsen**, D.P. Dobson, K.D. Litasov, and E. Ohtani (2006) Al, Fe substitution in MgSiO_3 perovskite structure: a single-crystal X-ray diffraction study. *Physics of the Earth and Planetary Interiors* 155, 96-103.

2005

- [27] Dubrovinskaia, N., L. Dubrovinsky, F. Langenhorst, **S.D. Jacobsen**, and C. Liebske (2005) Nanocrystalline diamond synthesized from C_{60} . *Diamond and Related Materials* 14, 16-22.
- [26] **Jacobsen, S.D.**, S. Demouchy, D.J. Frost, T.B. Ballaran and J. Kung (2005) Systematic study of OH in hydrous wadsleyite from polarized FTIR spectroscopy and single-crystal X-ray diffraction: oxygen sites for hydrogen storage in Earth's interior. *American Mineralogist* 90, 61-70.
- [25] **Jacobsen, S.D.**, J.F. Lin, R.J. Angel, G. Shen, V.B. Prakapenka, P. Dera, H.-K. Mao, and R.J. Hemley (2005) Single-crystal synchrotron X-ray diffraction study of wüstite and magnesiowüstite at lower-mantle pressures. *Journal of Synchrotron Radiation* 12, 577-583.
- [24] **Jacobsen, S.D.**, H.J. Reichmann, A. Kantor, and H. Spetzler (2005) A gigahertz ultrasonic interferometer for the diamond-anvil cell and high-pressure elasticity of some iron-oxide minerals. In: J. Chen et al. (Eds.) *Advances in High-Pressure Technology for Geophysical Applications*, Elsevier, Amsterdam, pp. 25-48.

- [23] Lin, J.F., V.V. Struzhkin, **S.D. Jacobsen**, M.Y. Hu, P. Chow, J. Kung, H. Liu, H.K. Mao, R.J. Hemley (2005) Spin transition of iron in magnesiowüstite in the Earth's lower mantle. *Nature* 436, 377-380.
- [22] Lin, J.F., V.V. Struzhkin, **S.D. Jacobsen**, G. Shen, V. Prakopenka, H.K. Mao, R.J. Hemley (2005) X-ray emission spectroscopy with a laser-heated diamond anvil cell: a new experimental probe of the spin state of iron in the Earth's interior. *Journal of Synchrotron Radiation* 12, 637-641.
- [21] Zotov, N., W. Kockelmann, **S.D. Jacobsen**, I. Mitov, D. Paneva, R.D. Vassileva and I. Bonev (2005) Structure and cation ordering in manganilvaite: a combined X-ray diffraction, neutron diffraction and Mössbauer study. *Canadian Mineralogist* 43, 1043-1053.

2004

- [20] Bromiley, G.D., H. Keppler, C. McCammon, F.A. Bromiley and **S.D. Jacobsen** (2004) Hydrogen solubility and speciation in natural, gem-quality chromian diopside. *American Mineralogist* 89, 941-949.
- [19] Dobson, D.P. and **S.D. Jacobsen** (2004) The flux growth of magnesium silicate perovskite single crystals. *American Mineralogist* 89, 807-811.
- [18] **Jacobsen, S.D.**, J.R. Smyth, H.A. Spetzler, C.M. Holl, and D.J. Frost (2004) Sound velocities and elastic constants of iron-bearing hydrous ringwoodite. *Physics of the Earth and Planetary Interiors* 143-144, 47-56.
- [17] **Jacobsen, S.D.**, H.A. Spetzler, H.J. Reichmann and J.R. Smyth (2004) Shear waves in the diamond-anvil cell reveal pressure-induced instability in (Mg,Fe)O. *Proceedings of the National Academy of Sciences USA* 101, 5867-5871.
- [16] Kantor, A.P., **S.D. Jacobsen**, Y.K. Kantor, L.S. Dubrovinsky, C.A. McCammon, H.J. Reichmann and I.N. Goncharenko (2004) Pressure-induced magnetization in FeO: evidence from elasticity and Mössbauer spectroscopy. *Physical Review Letters* 93, 215502.
- [15] Reichmann, H.J. and **S. D. Jacobsen** (2004) High-pressure elasticity of a natural magnetite crystal. *American Mineralogist* 89, 1061-1066.
- [14] Smyth, J.R., C.M. Holl, D.J. Frost and **S.D. Jacobsen** (2004) High-pressure crystal chemistry of hydrous ringwoodite and water in the Earth's interior. *Physics of the Earth and Planetary Interiors* 143-144, 271-278.
- [13] Xu, J., Y. Ding, **S.D. Jacobsen**, H.K. Mao, R.J. Hemley, J. Zhang, J. Qian, C. Pantea, S.C. Vogel, D.J. Williams, and Y. Zhao (2004) Powder neutron diffraction of wüstite (Fe_{0.93}O) to 12 GPa using large moissanite anvils. *High-Pressure Research* 24, 247-253.

2003

- [12] **Jacobsen, S.D.**, J.R. Smyth, and R.J. Swope (2003) Thermal expansion of hydrated six-coordinate silicon in thaumasite, Ca₃Si(OH)₆(CO₃)(SO₄)·12 H₂O. *Physics and Chemistry of Minerals* 30, 321-329.
- [11] Smyth, J.R., C.M. Holl, D.J. Frost, **S.D. Jacobsen**, F. Langenhorst, and C.A. McCammon (2003) Structural systematics of hydrous ringwoodite and water in Earth's interior. *American Mineralogist* 88, 1402-1407.

2002

- [10] **Jacobsen S.D.**, H.J. Reichmann, H.A. Spetzler, S.J. Mackwell, J.R. Smyth, R.J. Angel, R.J., and C.A. McCammon (2002) Structure and elasticity of single-crystal (Mg,Fe)O and a new method of generating shear waves for gigahertz ultrasonic interferometry, *Journal of Geophysical Research* 107(B2), 2037, doi: 10.1029/2001JB000490.
- [9] **Jacobsen S.D.**, H.A. Spetzler, H.J. Reichmann, J.R. Smyth, S.J. Mackwell, R.J. Angel, and W.A. Bassett (2002) GHz-ultrasonic interferometry at high *P* and *T*: New tools for a thermodynamic equation of state. *Journal of Physics: Condensed Matter* 14, 11525-11530.

2000

- [8] Holl, C.M., J.R. Smyth, H.M. Smith, **S.D. Jacobsen**, and R.T. Downs (2000) Compression of witherite to 8 GPa and the crystal structure of BaCO₃-II. *Physics and Chemistry of Minerals* 27, 467-473.
- [7] **Jacobsen, S.D.**, J.R. Smyth, R.J. Swope, and R. Sheldon (2000) Two proton positions in the very strong hydrogen bond of serandite, NaMn₂[Si₃O₈(OH)]. *American Mineralogist* 85, 745-752.
- [6] Reichmann, H.J., **S.D. Jacobsen**, S.J. Mackwell, and C.A. McCammon (2000) Sound wave velocities and elastic constants for magnesiowüstite using gigahertz interferometry. *Geophysical Research Letters* 27, 799-802.
- [5] Smyth, J.R., **S.D. Jacobsen**, and R.M. Hazen (2000) Comparative crystal chemistry of orthosilicate minerals. In: R.M. Hazen and R.T. Downs (Eds.) High-temperature and high-pressure crystal chemistry, *Reviews in Mineralogy and Geochemistry* 41, 187-209.
- [4] Smyth, J.R., **S.D. Jacobsen**, and R.M. Hazen (2000) Comparative crystal chemistry of dense oxide minerals. In: R.M. Hazen and R.T. Downs (Eds.) High-temperature and high-pressure crystal chemistry, *Reviews in Mineralogy and Geochemistry* 41, 157-186.
- [3] Smyth, J.R., **S.D. Jacobsen**, R.J. Swope, R.J. Angel, T. Arlt, K. Domanik, and J.R. Holloway (2000) Crystal structures and compressibilities of synthetic 2M₁ and 3T phengite micas. *European Journal of Mineralogy* 12, 955-963.

1998

- [2] **Jacobsen, S.D.**, Smyth, J.R., Swope, R.J., and R.T. Downs (1998) Rigid-body character of the SO₄ groups in celestine, anglesite, and barite. *Canadian Mineralogist*, 36, 1053-1060.

1997

- [1] Smyth, J.R., T. Kawamoto, **S.D. Jacobsen**, R.J. Swope, R.L. Herving, and J.R. Holloway (1997) Crystal structure of monoclinic hydrous wadsleyite, [β-(Mg,Fe)₂SiO₄]. *American Mineralogist*, 82, 270-275.

Books and Edited Volumes

- Goncharov, A., **S.D. Jacobsen**, V. Struzhkin and P. Beck (2008) Optical properties of deep-Earth minerals. *McGraw-Hill Yearbook of Science & Technology* 2008, 242-245.
- Jacobsen, S.D.** and S. van der Lee (2006) *Earth's Deep Water Cycle*, Geophysical Monograph 168, American Geophysical Union, Washington D.C., 314 pages, ISBN: 978-0-87590-433-7 (Editors).
- Dera, P., C.T. Prewitt, and **S.D. Jacobsen** (2005) Structure Determination by Single-Crystal X-ray Diffraction at Megabar Pressures. *Journal of Synchrotron Radiation*, Vol 12, Part 5 (Editors).