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WRITINGS AND CREATIVE ACTIVITIES IN PROGRESS

Articles:

J. Faust Larsen, E. Knittle and Q. Williams, Constraints on the speciation of hydrogen in Earth's transition zone, *Phys. Earth Planet. Inter.*, in press, 2002.

L. Stupi and E. Knittle, Synthesis of complex Fe-O-S alloys at high pressures: implications for chemistry of the outer core, *J. Geophys. Res.*, submitted 2002.

PUBLISHED WRITINGS AND CREATIVE ACTIVITIES

Edited Books:

The Core-Mantle Boundary Region, *Geodynamics Series Vol. 28*, M. Gurnis, M.E. Wyssession, E. Knittle, B.A. Buffett, Eds., American Geophysical Union Press, Washington D.C., 334 pp., 1998.

Articles in Professional Journals:

E. Knittle and R. Jeanloz, Structural and bonding changes in cesium iodide at high pressure, *Science*, 223, 574-576, 1984.

E. Knittle and R. Jeanloz, High pressure x-ray diffraction and optical absorption studies of CsI, *J. Phys. Chem. Solids*, 46, 1179-1184, 1985.

E. Knittle, A. Rudy and R. Jeanloz, High-pressure phase transition in CsBr, *Phys. Rev. B.*, 31, 588-590, 1985.

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E. Knittle and R. Jeanloz, High-pressure electrical resistivity measurements in Fe₂O₃: comparison of static compression and shock-wave experiments to 61 GPa, *Solid State Comm.*, 58, 129-131, 1986.

E. Knittle, R. Jeanloz, A.C. Mitchell and W.J. Nellis, Metallization of Fe_{0.94}O at elevated pressure and temperatures observed by shock-wave electrical resistivity measurements, *Solid State Comm.*, 59, 513-515, 1986.

E. Knittle and R. Jeanloz, High-pressure metallization of FeO and implications for the Earth's core, *Geophys. Res. Lett.*, 13, 1541-1545, 1986.

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W.E. Jackson, E. Knittle, G.E. Brown, Jr. and R. Jeanloz, Partitioning of Fe within high-pressure silicate perovskite: evidence for unusual geochemistry in the lower mantle, *Geophys. Res. Lett.*, 14, 224-226, 1987.

E. Knittle, R. Wentzcovitch, R. Jeanloz and M.L. Cohen, Experimental and theoretical equation of state of cubic boron nitride, *Nature*, 337, 349-352, 1989.

E. Knittle and R. Jeanloz, Melting curve of (Mg,Fe)SiO₃ perovskite to 96 GPa: evidence for a structural transition in lower mantle melts, *Geophys. Res. Lett.*, 5, 421-424, 1989.

R. Jeanloz and E. Knittle, Density and composition of the lower mantle, *Phil. Trans. Roy. Soc. (London)*, Ser. A., 328, 377-389, 1989.

E. Knittle and R. Jeanloz, Simulating the core-mantle boundary: an experimental study of high-pressure reactions between silicates and liquid iron, *Geophys. Res. Lett.*, 16, 609-612, 1989.

Q. Williams, E. Knittle, R. Reichlin, S. Martin and R. Jeanloz, Structural and electronic properties of Fe₂SiO₄-fayalite at ultra-high pressures: amorphization and gap closure, *J. Geophys. Res.*, 95, 21549-21563, 1990.

Q. Williams, E. Knittle and R. Jeanloz, The high-pressure melting curve of iron: a technical discussion, *J. Geophys. Res.*, 96, 2171-2184, 1991.

E. Knittle and R. Jeanloz, The Earth's core-mantle boundary: results of experiments at high pressures and temperatures, *Science*, 251, 1438-1443, 1991.

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D.L. Heinz, E. Knittle, J.S. Sweeney, Q. Williams and R. Jeanloz, High pressure melting of (Mg,Fe)SiO₃- perovskite, *Science*, 264, 279-280, 1994.

- J. Faust and E. Knittle, Static compression of chondrodite: implications for water in the upper mantle, *Geophys. Res. Lett.*, 21, 1935-1938, 1994.
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- E. Knittle and Q. Williams, Static compression of e-FeSi and an evaluation of reduced silicon as a deep Earth constituent, *Geophys. Res. Lett.*, 22, 445-448, 1995.
- E. Knittle, R.B. Kaner, R. Jeanloz and M.L. Cohen, High-pressure synthesis, characterization, and equation of state of cubic C-BN solid solutions, *Phys. Rev. B.*, 51, 12149-12156, 1995.
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- J. Faust and E. Knittle, The stability and equation of state of majoritic garnet synthesized from natural basalt at mantle conditions, *Geophysical Research Letters*, 23, 3377-3380, 1996.
- C. Cloos, E. Knittle and F. Bridges, An XAFS study of the crystal chemistry of iron in orthopyroxene, *American Mineralogist*, 81, 1321-1311, 1996.
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- E. Knittle, Review of Introduction to Mineralogy by W.D. Nesse, *EOS Trans. Am. Geophys. Union*, 81, p.389, 2000. (Book review)
- H.P. Scott, Q. Williams and E. Knittle, Stability and equation of state of Fe₃C to 73 GPa: implications for carbon in the Earth's core, *Geophys. Res. Lett.*, 28, 1875-1878, 2001.
- E. Knittle, W. Phillips and Q. Williams, An infrared and Raman spectroscopic study of gypsum at high pressures, *Phys. Chem. Minerals*, 28, 630-640, 2001.
- H.P. Scott, Q. Williams and E. Knittle, Ultralow compressibility for a silicate without highly coordinated silicon, *Physical Review Letters*, 88, 2002.
- P. Cervantes, Z. Slanic, F. Bridges, E. Knittle and Q. Williams, The band gap and electrical resistivity of FeS₂-pyrite at high pressures, *J. Phys. Chem. Solids*, 63, 1927-1933, 2002.
- Q. Williams and E. Knittle, Structural complexity in carbonatite liquid at high pressures, *Geophys. Res. Lett.*, 30(1), 1022, 2003.
- J. Santillan, Q. Williams and E. Knittle, Dolomite-II: A high pressure polymorph of $\text{CaMg}(\text{CO}_3)_2$, *Geophys. Res. Lett.*, 30(2), 1054, 2003.

Chapters in Books:

- R. Jeanloz and E. Knittle, Reduction of mantle and core properties to a standard state by adiabatic decompression, in *Chemistry and Physics of Terrestrial Planets*, S. Saxena, editor, Springer-Verlag, New York, pp. 275-310, 1986.
- E. Knittle and R. Jeanloz, The activation energy of the back transformation of silicate perovskite to enstatite, in *High Pressure Research in Mineral Physics*, M.H. Manghnani and Y. Syono, editors, American Geophysical Union, Washington, D.C., pp. 243-250, 1987.
- Q. Williams, E. Knittle and R. Jeanloz, (Mg,Fe)SiO₃ perovskite: geophysical and crystal chemical significance, in *Perovskites: A Structure of Great Interest in the Earth and Material Sciences*, A. Navrotsky and D.J. Weidner, Eds., American Geophysical Union Press, 1-12, 1989.
- J. Longhi, E. Knittle, J.R. Holloway and H. Wänke, The bulk composition, mineralogy, and internal structure of Mars, in *Mars*, H.H. Kieffer, B.M. Jakosky, C.W. Snyder and M.S. Matthews, Eds., University of Arizona Press, pp.184-209, 1992.
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- E. Knittle, Static compression measurements of equations of state, in *Mineral Physics and Crystallography: A Handbook of Physical Constants*, T.J. Ahrens, Ed., American Geophysical Union Press, pp. 98-143, 1995.
- D. Orange, E. Knittle, D. Farber and Q. Williams, Raman spectroscopy of crude oils and hydrocarbon fluid inclusions: a feasibility study, in *Mineral Spectroscopy: A Tribute to Roger Burns*, M.D.Dyar, C. McCammon and M.W. Schaefer, Eds., The Geochemical Society, Special Publication No. 5, pp. 65-81, 1996.
- E. Knittle, The solid/liquid partitioning of major and radiogenic elements at lower mantle pressures: implications for the core-mantle boundary region, in *The Core-Mantle Boundary Region*, Geodynamics Series 28, M. Gurnis, M.E. Wyssession, E. Knittle, B.A. Buffett, Eds., American Geophysical Union Press, pp. 119-130, 1998.
- M. Gurnis, M.E. Wyssession, E. Knittle and B.A. Buffett, Introduction, in *The Core-Mantle Boundary Region*, Geodynamics Series 28, M. Gurnis, M.E. Wyssession, E. Knittle, B.A. Buffett, Eds., American Geophysical Union Press, pp. 1-3, 1998.
- H.P. Scott, Q. Williams, and E. Knittle, Infrared spectra of the zircon and scheelite polymorphs of ZrSiO₄ to 26 GPa, in *Science and Technology of High Pressure*, Proceedings of AIRAPT -17, M.H. Manghnani, W.J. Nellis, M.F. Nicol, Eds., Universities Press, pp. 521-524, 2000.

Patent Pending:

Novel Ultra-hard materials: Scheelite-structured $ZrSiO_4$ and $Zr(SixGe_{1-x})O_4$ (with H.Scott and Q. Williams).