

Curriculum Vita

JOSEPH R. SMYTH

Address: Department of Geological Sciences, University of Colorado, Boulder, CO 80309-0399

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Education:

Virginia Tech

B. S. Geology, 1966

University of Chicago

S. M. Geophysical Sciences, 1968

Ph.D. Geophysical Sciences, 1970; Advisor: Joseph V. Smith

Thesis: High Temperature Single-Crystal X-ray Studies of Low-Calcium Pyroxenes

Professional Experience:

Harvard University, Research Fellow in Geology, 1970-1972; Advisor: C. W. Burnham

Lunar Science Institute, Houston, TX Staff Scientist, 1972-1976

University of Cape Town, R.S.A. Senior Lecturer, 1975-1976

University of California, Los Alamos National Laboratory Staff Member, 1976-1984

University of Colorado

Assistant Professor of Geology, 1983-1986

Associate Professor of Geology, 1986-1989

Professor of Geology, 1989-present

Research Interests:

Crystal chemistry of volatiles in silicate and oxide minerals and storage of water and CO₂ in the Earth's interior. (<http://ruby.colorado.edu/~smyth/Research/Research.html>)

Professional Societies:

Mineralogical Society of America, 1965- (Life Fellow)

Mineralogical Society of Japan, 1974-;

American Geophysical Union, 1971- (Fellow, 2007)

Honors

American Geophysical Union, Fellow 2007

Deutsche Mineralogische Gesellschaft: Abraham Gottlob Werner Medal 2017

Alexander von Humboldt Foundation, Senior Research Award (*Preistrager*) 2004

Mineralogical Society of America: Member since 1965; Life Fellow 1991.

Collaborators (last 48 months)

S.D. Jacobsen (Northwestern), C.A. McCammon, D.J. Frost, T. Boffa-Ballaran, H. Keppler, D. Trots (Bayreuth),

Y. Wang, V. Prakapenka, G. Shen (U.Chicago), M. Manghnani, A. Hushur, P. Dera, G. Huss (Hawaii), C.

Sanchez-Valle (Zurich), F. Nestola, (Padua), Z. Mao (USTChina), T.S. Duffy (Princeton), W. Panero (Ohio

State), N. Bolfan-Casanova, D. Avignant (Clermont-Ferrand), B. Poe, C. Romano (Rome).

Teaching Interests:

Introductory Geology, Mineralogy, Crystallography, Rock-Forming Minerals, Earth's Interior

(<http://ruby.colorado.edu/~smyth/Courses/Teaching.html>)

Ph.D. Students

F. A. Caporuscio (Los Alamos), R. J. Swope (Purdue, IUPUI), H. M. S. Laustsen (Oregon),

S.D. Jacobsen (Northwestern), C. M. Holl (Princeton), Y. Ye (China U. Geosci., Wuhan). L. Zhang (PekingU.)

Synergistic Activities and Service

Co-convener, co-editor of MSA/DMG Short course on H in nominally anhydrous minerals October, 2006

Undergraduate teaching and curriculum development: Syllabi and lecture notes available on website.

Associate Editor *Mineralogical and Petrological Sciences (Japan)*

E.U. Research Infrastructure Access Review Panel 2005-8; COMPRES Consortium elector.

SELECTED REFEREED PUBLICATIONS (of more than 170 to date) (H-index 49 (Google Scholar)):

- J. R. Smyth and D. L. Bish (1988) *Crystal Structures and Cation Sites of the Rock-Forming Minerals*. Allen and Unwin, Boston, 358 pp. *This is a reference book on crystal structures and cation site parameters for approximately 300 rock-forming mineral species. It has been cited more than 200 times. Although out of print, a free pdf can be found at <http://ruby.colorado.edu/~smyth/Research/Papers/Book1.pdf>*
- J. R. Smyth and C. J. Hatton (1977) A coesite-sanidine grosspydite from the Roberts-Victor Kimberlite. *Earth and Planetary Science Letters* **34**, 284-290. *This was the first petrographic description of a coesite-bearing eclogite and the first report of coesite in non-impact metamorphic rocks. Coesite was unambiguously identified by single-crystal X-ray diffraction. The textural descriptions in this paper led to the recognition of coesite in many UHP metamorphic rocks. (<http://ruby.colorado.edu/~smyth/Research/Coesite.pdf>)*
- J. R. Smyth (1989) Electrostatic characterization of oxygen sites in minerals. *Geochimica et Cosmochimica Acta* **53**, 1101-1110. *This was a report of calculation of bonding potentials for over 1000 oxygen sites in the common rock-forming minerals. These parameters form the basis for numerical prediction of oxygen isotope fractionation in minerals.*
- J. R. Smyth and T.C. McCormick (1995) Crystallographic data for minerals. *Mineral Physics and Crystallography: A Handbook of Physical Constants*, AGU Reference Shelf 2, AGU Washington, D.C., 1-17. (This 3 volume set received the Geoscience Information Society Award "Best new reference work" award 1996.)
- J. R. Smyth, S.D. Jacobsen, and R.M. Hazen (2000) Comparative crystal chemistry of the dense oxide minerals. *Reviews in Mineralogy* **41**, 157-186. *This is a review of the effects of temperature and pressure on the crystal structures of the dense oxide minerals. (<http://ruby.colorado.edu/~smyth/Research/Oxides.pdf>)*
- J. R. Smyth (1987) Beta-Mg₂SiO₄: a potential host for water in the mantle? *American Mineralogist* **72**, 1051-1055. *This was a prediction based on bond strength calculations that the O(1) site in wadsleyite is a potential site for protonation. While nominally anhydrous, wadsleyite has since been shown to be able to be capable of containing more H than the hydrosphere. <http://ruby.colorado.edu/~smyth/Research/Wads87.pdf>*
- J. R. Smyth, D.R. Bell, and G.R. Rossman (1991) *Hydrous clinopyroxenes from the upper mantle*. *Nature* **351**, 732-735. *This was a report of the correlation of cation vacancies with H content on mantle-derived clinopyroxene. <http://ruby.colorado.edu/~smyth/Research/Nature.pdf>*
- J. R. Smyth and T. Kawamoto (1997) Wadsleyite II: a new high pressure hydrous phase in the peridotite-H₂O system. *Earth and Planetary Science Letters*, 146, E9-16. *This was a report of the crystal structure of a new 29Å-spinelloid phase occurring in peridotite compositions at conditions of the transition zone. <http://ruby.colorado.edu/~smyth/Research/Wads2.pdf>*
- A. Hushur, D. Lonappan, Yu, Y., J.R. Smyth, M.H. Manghnani, P. Dera, D.J. Frost (2010) Equation of state of Phase D to 56 GPa. *Journal of Geophysical Research*, 116, B06203, doi:10.1029/2010JB008087
- J.R. Smyth, N. Miyajima, E. Hillebrand, G. Huss, D.C. Rubie and D.J. Frost (2012) Olivine-wadsleyite-pyroxene epitaxy: element and volatile distributions at the 410 km discontinuity. *Physics of the Earth and Planetary Interiors* 200, 85-91.

For a full list of publications with links to reprints: <http://ruby.colorado.edu/~smyth/Research/Papers/Papers.html>