

## **Vita**

### John H. Fournelle

Senior Scientist

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Research interests: Electron microscopy, microanalysis and compositional imaging; volcanic petrology

### Education:

Ph.D., 1989, The Johns Hopkins University

M.S., 1985, The Johns Hopkins University

B.S., 1983, University of Maryland

### Postdoctoral Fellowships:

1990: The Johns Hopkins University

1989: Smithsonian Institution

### Positions Held:

University of Wisconsin-Madison, Dept. of Geology & Geophysics, Assistant Scientist, 1992–1999;  
Associate Scientist, 1999 – 2005; Senior Scientist, 2005-current; Director Cameron Electron  
Microprobe Lab 1992-current; Director, S.W. Bailey XRD Lab, 2003-2005; Director, SEM Lab,  
2006-current

University of Maryland, University College, Part-time Lecturer, 1991 - 1992

West Chester University, Instructor (Temporary), 1991

### Fellowships/Research Grants

GSA Research Grants, 1984, 1985 (1984: Harold T. Stearns Award)

Sigma Xi Research Grant, 1985

Arctic Institute of North America Research Grant, 1985

National Geographic Research Grant, 1989

UW-Madison Academic Staff Professional Development Grants, 1995, 1998, 2000

NSF EAR-0447332 (Goodwin Fournelle Tikoff Valley Xu) 2005: \$260K for versatile SEM acquisition

NSF EAR-0813918 (Goodwin, Fournelle) 2008: \$5000 for student support for EBSD workshop

NSF EAR-1015246 (Goodwin, Fournelle) 2010: \$10,000 for student support for EBSD workshop

### Awards

Best Paper Award, American Foundry Society 2001/2002 Melting Methods and Materials Division (Loper,  
Park and Fournelle, 2001)

### Professional Memberships:

Microbeam Analysis Society, member; Director 2006-2008; Archivist 2007-

Midwest Microscopy and Microanalysis Society, Executive Council Member, Newsletter Editor, 1998-2002

International Association of Volcanology and Chemistry of the Earth's Interior, member

American Geophysical Union, member; AGU History Committee, member 2005-

Geological Society of America, member

Mineralogical Society of America, member; Roebling Medal Committee, 1996-7

### Publications

Kita' N. T., Hiroko Nagahara, Shogo Tachibana, Shin Tomomura, Michael J. Spicuzza, John H. Fournelle  
and John W. Valley, 2010 in review, High precision SIMS oxygen three isotope study of chondrules  
in LL3 chondrites: role of ambient gas during chondrule formation, GCA

- Huberty, J.M., Kita, N.T., Kozdon, R., Heck, P.R., Fournelle, J.H., Spicuzza, J.J., Huifang, X. and Valley, J.W., 2010 in press, Crystal orientation effects in d18O for magnetite and hematite by SIMS, *Chemical Geology*
- Kozdon, R., Kita, N.T., Huberty, J.M., Fournelle, J.H., Johnson, C.A. and Valley, J.W., 2010 in press, In situ sulfur isotope analysis of sulfide minerals by SIMS: Precision and accuracy, with application to thermometry of ~3.5 Ga Pilbara cherts, *Chemical Geology*
- Zhu, J., Zhang, C., Ballard, D., Martin, P., Fournelle, J., Cao, W., Chang, Y., 2010, Study of the Ni-rich multi-phase equilibria in the Ni-Al-Pt alloys using the cluster/site approximation for the face-centered cubic phases, *Acta Materialia*, **58**(1), 180-188.
- Smith, M.E., Singer, B.S., Carroll, A.R., and Fournelle, J.H., 2008, Precise dating of biotite in distal ash: Isolating subtle alteration using  $^{40}\text{Ar}/^{39}\text{Ar}$  laser incremental heating and electron microprobe techniques: *American Mineralogist*, **93**, 784-795.
- Fu, B., Page, F.Z., Cavosie, A.J., Fournelle, J., Kita, N.T., Lackey, J-S., Wilde, S.A., and Valley, J.W., 2008, Ti-in-zircon thermometry: Applications and limitations: *Contributions to Mineralogy and Petrology*, **156** (2), 197-215.
- Fournelle, John, 2007, Book Review of Energy Dispersive Spectrometry of Common Rock Forming Minerals by Kenneth P. Severin, *American Mineralogist*, **92**, 2006.
- Page FZ, Fu B, Kita NT, Fournelle F, Spicuzza MJ, Schulze DJ, Viljoen F, Basei M A S and Valley J W, 2007, Zircons from kimberlite: new insights from oxygen isotopes, trace elements, and Ti in zircon thermometry, *Geochim. Cosmochim. Acta*, **71**, 3887-3903.
- Smith, M.E., Singer, B.S., Carroll, A.R., and Fournelle, J.H., 2006, High-resolution calibration of Eocene strata:  $^{40}\text{Ar}/^{39}\text{Ar}$  geochronology of biotite in the Green River Formation: *Geology*, **34**, 393-396.
- Medaris, L.G. Jr, Ghent, E.D., Wang, H.F., Fournelle, J.H. and Jelinek, E., 2006, The Spatice eclogite: constraints on the P-T-t history of the Gfohl granulite terrane, Moldanubian Zone, Bohemian Massif, *Minerology and Petrology*, **86**, 203-220.
- Fournelle, J.H., Kim, S. and Perepezko, J.H., 2005, Monte Carlo simulation of Nb Ka secondary fluorescence in EPMA: comparison of PENELOPE simulations with experimental results, *Surface and Interface Analysis*, **37**, 1012-1016.
- Jicha, B R; Singer, B S; Brophy, J G; Fournelle, J H; Johnson, C M; Beard, Brian L; Lapen, T J; Mahlen, N J., 2004, Variable impact of the subducted slab on Aleutian island arc magma sources: evidence from Sr, Nd, Pb, and Hf isotopes and trace element abundances, *Journal of Petrology*, **45**, 1845-1875.
- Emerson, N. R., Simo, J. A., Byers, C. W., and Fournelle, J., 2004, Correlation of (Ordovician, Mohawkian) K-bentonites in the Upper Mississippi Valley by using apatite chemistry: implication for stratigraphic interpretations of the mixed carbonate-siliciclastic Decorah Formation, *Palaeogeography, Palaeoclimatology, Palaeoecology*, **210**, 215-233.
- Medaris, L.G. Jr., Fournelle, J.H. and Henry, D. J., 2003, Tourmaline-bearing quartz veins in the Baraboo Quartzite, Wisconsin: Occurrence and significance of foitite and 'oxy-foitite', *The Canadian Mineralogist*, **41**, 749-758.
- Schoeninger, M.J., Hallin, K., Reeser, H., Valley J.W. and Fournelle, J., 2003, Isotopic alteration of mammalian tooth enamel, *International Journal of Osteoarchaeology*, **13**, 11-19.
- Gilbert, B., Frazer, B.H., Naab, F., Fournelle, J. and Valley, J.W., and DeStasio, G., 2003, X-ray absorption spectroscopy of silicates for in situ, sub-micrometer mineral identification, *American Mineralogist*, **88**, 763-769.
- Carson, E.C., Fournelle, J.H., Miller, T.P., and Mickelson, D.M., 2002: Holocene tephrochronology of the Cold Bay area, southwest Alaska Peninsula, *Quaternary Science Reviews*, **21**, 2185-2200.
- Jakubowski, R. T., Fournelle, J., Welch, S., Swope, R.J. and Camus, P., 2002, Evidence for magmatic vapor deposition of anhydrite prior to the 1991 climactic eruption of Mt. Pinatubo, Philippines, *American Mineralogist*, **87**, 1029-1045.
- Eiler, J.M., J.W. Valley, C.M. Graham, and J. Fournelle, 2002, Two populations of carbonate in ALH84001: Geochemical evidence for discrimination and genesis, *Geochemica et Cosmochimica Acta*, **66**, 1285-2002.
- Bindeman, I.N., J.H. Fournelle, and J.W. Valley, 2001, Low- $\delta^{18}\text{O}$  tephra from a compositionally zoned magma body: Fisher Caldera, Unimak Island, Aleutians, *Journal of Volcanology and Geothermal Research*, **111**, 35-53.
- Loper, C.R. Jr, J. Park and J. Fournelle, 2001, Effect of calcium on the Widmanstätten graphite formation in lead-contaminated gray cast iron, *American Foundry Society Transactions* 01-095, 1249-1279.
- Medaris L. G., H.F. Wang, J. H. Fournelle, J. H. Zimmer and E. Jelinek, 1999, A cautionary tale of spinel peridotite thermobarometry: an example from xenoliths of Kazakov Volcano, Czech Republic, *Geology*, **27**, 92-96.

- Medaris, L.G., J. H. Fournelle, E. D. Ghent, E. Jelinek and Z. Misar, 1998, Prograde eclogite in the Gfohl Nappe, Czech Republic: new evidence on Variscan high-pressure metamorphism, *Journal of Metamorphic Geology*, **16**, 563-576.
- Hageman, S. G., Philip E. Brown, John Ridley, Peter Stern, and John Fournelle, 1998, Ore petrology, chemistry and timing of electrum in the Archean hypozonal Transvaal lode-gold deposit, Western Australia, *Economic Geology*, **93**, 271-291.
- Swenson, D., Nieh, T-G; Fournelle, J.H., 1998, Solid-state phase relationships in the calcia-titania-zirconia system at 1200 degrees C, *Journal of the American Ceramic Society*, **81**, 3249-3252
- Medaris, L.G., Jr., J.H. Fournelle, H.F. Wang and E. Jelinek, 1997, Thermobarometry and reconstructed chemical compositions of spinel-pyroxene symplectites: evidence for pre-existing garnet in lherzolite xenoliths from Czech neogene lavas, *Russian Geology and Geophysics*, **38**, 277-286.
- Fournelle, J., R. Carmody, and A. Daag, 1996, Anhydrite-bearing pumices from the June 15, 1991, eruption of Mount Pinatubo: Geochemistry, mineralogy and petrology, *in* Punongbayan and Newhall (ed.), *Fire and Mud: Eruptions and Lahars of the Mount Pinatubo*, Philippines, PHIVOLCS-University of Washington, 845-863.
- Swenson, D.; Nieh, T.-G.; Fournelle, J.-H., 1996, The CaO-TiO<sub>2</sub>-ZrO<sub>2</sub> system at 1200 degrees C and the solubilities of Hf and Gd in zirconolite, in *Scientific-Basis-for-Nuclear-Waste-Management-XIX.-Symposium* (Eds: Murphy, W.-M.; Knecht, D.-A.), 337-44
- Fournelle, J., B.D. Marsh, and J.D. Myers, 1994, Age, character and significance of Aleutian Arc Volcanism, *in* Plafker and Berg (ed.), *The Geology of Alaska: Boulder, Colorado*, Geological Society of America, *The Geology of North America*, G-1, 723-757.
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- Fournelle, J., 1990, Anhydrite in Nevado del Ruiz November 1985 pumice: relevance to the sulfur problem, *Journal of Volcanology and Geothermal Research*, **42**, 189-201.
- Marsh, B.D., J. Fournelle, J.D. Myers and I-M. Chou, 1990, On plagioclase thermometry in island-arc rocks: experiments and theory, *in* *Fluid-Mineral Interactions: A Tribute to H.P. Eugster* (eds. R.J. Spencer and I-M. Chou), *Geochemical Society Special Publication*, **2**, 65-83.
- Melson, W.G., J.F. Allan, D.R. Jerez, J. Nelen, M.L. Calvache, S.N. Williams, J. Fournelle and M. Perfit, 1990, Water contents, temperatures and diversity of the magmas of the catastrophic eruption of Nevado del Ruiz, Colombia, November 13, 1985, *Journal of Volcanology and Geothermal Research*, **41**, 97-126.

#### Contributor

- Fournelle, J., 1990: Shishaldin, Isanotski, and Roundtop Volcanoes, in: *Volcanoes of North America*, C.A. Wood and J. Kienle, Eds., p.48-50.

#### Books – On Line Manual

- Donovan, John with co-editors Dan Kremser and John Fournelle, 2009, *Probe for EPMA – User’s Guide and Reference Manual*, Advanced Microbeam Inc., 355 pages.

#### **Abstracts**

- Kita, N.T., Ushikubo, T., Davis, A. M., Knight, K. B., Mendybaev, R. A., Richter, F. M. and Fournelle, J. H., 2010, Initial <sup>26</sup>Al abundance in a Type B CAI: remelting of pre-existing refractory solid, *LPI Abstract*
- Fournelle, J., 2009, Notes on some crystals of San Carlos Olivine and EPMA standards, *Eos Trans, AGU V31E-2009*
- Gregory, R.T., Marsh, B.D., Teplow, W. and Fournelle, J., 2009, On the interaction of a vigorous hydrothermal system with an active magma chamber: the Puna Magma Chamber, Kilauea East Rift, Hawaii, *Eos Trans, AGU V11F-08*.
- Kozdon, R., Kita, N., Huberty, J., Fournelle, J., and Valley, J.W., 2009, In situ sulfur isotope analysis of sphalerite by SIMS: precision vs accuracy. *Eos Trans, V31E-2019*.
- Kita, N., Fournelle, J., Mendybaev, R., Knight, K., Davis, A.M., Richter, F.M., and Ushikubo, T., 2009, Evaluation of anorthite glass standards for high precision SIMS Al-Mg dating of early solar system materials. *Eos Trans, V31E-2020*.

- Singer, B.S., Greene, S.E., Smith, K.E., Jicha, B., Fournelle, J., Johnson, C., Beard, B., and Rogers, N.W., 2009, Petrologic, Sr and Th isotope insight to evolution of 1902 dacite, Volcan Santa Maria, Guatemala., *Eos Trans*, AGU V43H-03.
- Huberty, J.M., Kita, N.T., Heck, P.R., Kozdon, R., Fournelle, J.H., Xu, H.F., and Valley, J.W., 2009, Crystal orientation effects on bias of d18O in magnetite by SIMS, *Goldschmidt*
- Fournelle, J., 2009, Evaluating atmospheric particles – using EDS, WDS and EBSD. Invited talk, MAS Topical Conference April 22, College of Microscopy (McCrone)
- Medaris, L.G. Jr., Fournelle, J.H., 2009, Metamorphic pseudorutile in the Seeley Slate, Baraboo Range, Wisconsin. *Proceedings and Abstracts-Institute on Lake Superior Geology*, Vol 55 (1), 57-58.
- Fournelle, J., 2008, SEM microanalysis of particles: concerns and suggestions, *Eos Trans. AGU* 89(53), Fall Meet. Suppl., Abstract A43D-0333,.
- Kita, N.T., Ushikubo, T., Fournelle, J., Knight, K.B., Mendybaev, R.A., Davis, A.M., and Richter, F.M., 2008, Internal isochron of CAI using high precision SIMS Mg isotope analyses, *Geochimica et Cosmochimica Acta*, 72, A477.
- Fournelle, J., Zhang, C. and Chang, Y.A., 2008, Al-Ir compounds and the problem of light element-heavy element matrix corrections in EPMA: application of PENEPMA Monte Carlo Modeling, *Microscopy and Microanalysis*, Albuquerque
- Marinenko, R.B. and Fournelle, J., 2008, Wavelength dispersive electron microprobe quantification of a TiAl(NbW) alloy, NIST SRMs 2061 and 2062, *Microscopy and Microanalysis*, Albuquerque
- Fournelle, J., 2007, Peak shifts in Al, Mg, Si and Na in geologically important materials, *Eos Trans. AGU*, 88(52) Fall Mtg Supple, Abstract V51A-0328
- Fournelle, J., 2007, Problems in trace element EPMA: modeling secondary fluorescence with PENEPMA, *Eos Trans. AGU*, 88(52) Fall Mtg Supple, Abstract V51A-0329
- Kracher, A, Bindi, L., Bonazzi, P., Fournelle, J., Spring, P.G., 2007, Large errors in electron microprobe analysis of Laphamite due to uncertainties in ZAF correction parameters, *EOS, Abstracts of AGU Annual Meeting*
- Gustafson, R., White, B., Gustafson, M. and Fournelle, J., 2007, Development of a lunar agglutinate simulant, *Space Resources Roundtable VIII, LPI*.
- Fournelle, J., 2007, The problem of secondary fluorescence in EPMA in the application of the Ti-in-zircon geothermometer and the utility of PENEPMA Monte Carlo Program, *Microscopy and Microanalysis*, Ft. Lauderdale, FL
- Medaris, L.G., Jr., Fournelle, J. H. and Guggenheim, S., 2007, An occurrence of agrellite in the Wausau alkaline igneous complex, Marathon County, Wisconsin. *Proc & Abs – Inst on Lake Superior Geology*, 53, 50-51.
- Kita N. T., Nagahara H., Tachibana S., Fournelle J. H., and Valley J. W. , 2007, Oxygen Isotopic Compositions of Chondrule Glasses in Semarkona (LL3.0): Search for 16O-depleted Components in Chondrules. *Lunar Planet. Sci. Conf.*, 38th, abstract #1791.
- Fournelle, J, Severin, K., Wallace, K., Beget, J. and Larsen, J. ,2006, Electron microprobe techniques for use in tephrochronological analyses, *Eos Trans. AGU*, 87(52), F2299-2300.
- Fournelle, J.H., 2006, Software useful for training students in electron probe microanalysis, *Geological Society of America Abstracts with Programs*, 38, 284.
- Fournelle, J.H., 2006, Al and Mg Ka peak shifts in common silicate and oxide minerals: relevance to achieving the goal of 1% accuracy in EPMA, invited contribution, *Microscopy and Microanalysis*, *Microscopy and Microanalysis*, 12, Supplement 2, 822CD
- Fournelle, J.H. and P. Carpenter, 2006, Core community specifications for electron microprobe operating systems: software, quantity control, and data management issues, *Microscopy and Microanalysis*, *Microscopy and Microanalysis*, 12, Supplement 2, 880CD.
- Fournelle, J. and class of Geology 777, 2006, The significance of refractive index “K” values of 45 to 200 Å 2d LSMs, or, Why your long wavelength peak markers may not line up correctly, *Microscopy and Microanalysis*, 12, Supplement 2, 836CD.
- Fournelle, J.H., 2006 Silicate Peak Shifts, Spectrometer Peaking Issues and Standard/Specimen Size Discrepancies in EPMA: 3 Bumps in the Road to the Goal of 1% Accuracy, *Eos Trans. AGU*, 87(36)) Fall Mtg Supple, Abstract MB51A-04.
- Medaris, L.G., Singer, B.S., Zhang, X., Fournelle, J.H., Ghent, E.D., Brueckner, H.K., and Mehta, K., 2005, Eclogites in peridotites, Western Gneiss Region, Norway: characteristics and enigmatic Sm-Nd results, *Mitt. Osterr. Miner. Ges.* 150.

- Schoeninger, M.J., Reeser, H., Valley, J.W. and Fournelle, J., 2005, Variable diagenetic alteration in fossil enamel apatite indicated by cathodoluminescence, Abstract, Fifth International Bone Diagenesis Meeting
- Fournelle, J.H., Gosses, J., Kelly, J., Staffier, K., Waters, J. and Webber, C., 2005, Secondary fluorescence corrections for EPMA: PENELOPE MC simulations, *Microscopy and Microanalysis*, 11 (2), 1282CD.
- Fournelle, J.H., 2005, Al and Si quantitation in routine silicate epma: Maybe not so routine, *Geochimica et Cosmochimica Acta*, 69, Suppl, 589.
- Kelly, J., Gosses, J., Webber, C., Staffier, K and Fournelle, J. , 2005, PENELOPE computer simulations of secondary fluorescence in EPMA, *Geochimica et Cosmochimica Acta*, 69, Suppl, 590.
- Page F, Fu B, Kita NT, Fournelle J, Spicuzza MJ, Schulze DJ, Basei MA and Valley JW, 2005, Ti in Zircon Megacrysts From Kimberlite: Evidence for low Temperatures of Formation. *AGU 2005 Fall Meeting*, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract V41E-1509.
- Fu B, Cavosie AJ, Fournelle J. Kita NT, Lackey J, Page F, Wilde SA and Valley JW, 2005, Ti-in-Zircon Thermometer: Preliminary Results. *AGU 2005 Fall Meeting*, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract V41F-1538.
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- Fournelle, J., 2004, Al and Si Ka: peaks, peaking and the elusive 1% accuracy in “common” minerals, *Microscopy and Microanalysis*, 10, Suppl. 2, 908CD.
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- Fournelle, J. H., Ryan T. Jakubowski, Sue Welch, and R.J. Swope, 2003, 3D Petrography— Serendipitous discovery of magmatic vapor deposition of anhydrite at Mount Pinatubo by SEM imaging of outer crystal surfaces, *EOS*, V12A-0553.
- Medaris, L.G.Jr., Lapen, T.J., Fournelle, J.H., Johnson, C.M. and Beard, B.L., 2003, Archean to Paleozoic evolution of the Sandvik peridotite, Western Gneiss Region, Norway. *GSA Abstracts with Programs*, 35: 556.
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- Cavosie, A.J., Valley, J.W., Fournelle, J. and Wilde, S.A., 2002, Implications for sources of Jack Hills metasediments based on detrital chromite and zircon, *Geochim. Cosmochim. Acta*, 66, A125.
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- Jicha, B.R, Singer, B.S., Brophy, J.G., Fournelle, J.H, 2002, Resolving Late Pleistocene Volcanic History in the Aleutian Arc by Means of High Precision 40 Ar/39 Ar Geochronology, 3<sup>rd</sup> Biennial Workshop on Subduction Processes emphasizing the Kurile-Kamchatkan-Aleutian Arcs, Fairbanks.
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- Ryan T. Jakubowski, John Fournelle, Sue Welch, R.J. Swope and Patrick Camus, 2001, Evidence for High Temperature Magmatic Vapor Deposition of Anhydrite onto Phenocrysts Deposited in a 15 June 1991 Mount Pinatubo Pumice Deposit. *EOS*, 82, p. F-15.
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