

DEPT. OF EARTH & ENVIRONMENTAL SCIENCES
VANDERBILT UNIVERSITY
2301 VANDERBILT PL., STATION B 35-0105
NASHVILLE, TN 37235 U.S.A.
PHONE (615) 283-0775 FAX (615) 322-2138
EMAIL: JOHN.C.AYERS@VANDERBILT.EDU
WEB: [HTTP://WWW.VANDERBILT.EDU/EES/JOHNCAYERS](http://www.vanderbilt.edu/ees/johncayers)
JULY 21, 2009

CURRICULUM VITAE: DR. JOHN C. AYERS

SUMMARY OF QUALIFICATIONS

2006–present *Full Professor (Departments of Earth & Environmental Sciences and Environmental Engineering)*

1998–2006 *Associate professor*

1991–1998 *Assistant professor*

Dept. of Earth & Environmental Sciences, Vanderbilt University, Nashville, TN

- **Research:** *Trace Element, Aqueous and Isotope Geochemistry; Experimental Petrology; Ultra-high Pressure Metamorphism; Geochronology*
- **Teaching:** *Petrology, Geochemistry, Environmental Geochemistry, Aqueous Geochemistry, Environmental Applications of Geochemical Modeling, Environmental Geology, Freshman Seminar (Controversies in the Geosciences: Science and our Environment), Computer Methods in Geology, Physical Geology.*
- **Professional:** *Registered Professional Geologist, State of Tennessee; GIS consultant*
- **Personal:** *Born 5/12/63. Married, two children. Excellent health. Assistant Coach, boys baseball Fall 2003; girls softball spring 2008.*

EDUCATION

Ph.D. Geology: *1987–1991, Rensselaer Polytechnic Institute, Troy, NY*

- Bruce Watson advisor, "Experimental studies of the chemistry of aqueous fluid-accessory mineral systems at high P-T conditions with implications for fluid-rock interactions", 1991, 212 pp.

M.S. Geochemistry and Mineralogy: *1985–1987, The Pennsylvania State Univ., University Park, PA*

- David Egger advisor, "Partitioning of elements between silicate melt and salt water at mantle conditions", 1988, 132 pp.

B.S. Geochemistry, B.S. Geology: *1981–1985, State University of New York College at Fredonia*

PROFESSIONAL EXPERIENCE

GIS Consultant: *2006–present, ERS Group; 2008–, Roundtable Group*

Research Assistant: *1989 – 1991, Rensselaer Polytechnic Institute, Troy, NY*

Student Aid: *1989–1990, NY Dept. of Law, Environmental Protection Bureau*

- Performed geochemical and statistical tests on groundwater analyses for use in a legal case involving groundwater contamination. Collected groundwater samples in field. Submitted report.

Teaching Assistant: *1987–1988, Rensselaer Polytechnic Institute, Troy, NY*

- Taught laboratory sections of Geology I, Geology II, and Optical Mineralogy.

Teaching Asst., Research Asst.: *1985–1987, The Pennsylvania State Univ., University Park, PA*

- Taught lab sections of Crystallography, Optical Mineralogy, and Petrology; developed homeworks and graded papers for graduate courses Mineral Equilibria and Crystal Chemistry. Thesis research.

Tutor: 1983–1984, Educational Development Program, Fredonia, NY

- Tutored minority students in Geology, Chemistry, and Math.

Teaching Assistant: 1983–1984, State University New York College at Fredonia

- Assisted in laboratory sections of Igneous Petrology, Physical Geology, and General Chemistry.

AWARDS RECEIVED

- Mineralogical Society of America Biennial Research Grant (1990)
- MacDiarmid Award (Outstanding Student) (1984)
- Fahnestock Scholarship (Field School) (1984)
- New York State Regents Scholarship (1981)

SPECIAL SKILLS

- *Language:* basic German, minimal Mandarin.
- *Computer:* BASIC programming, Windows NT/2000 server system administration, web page design and site administration, image analysis, GIS, Geochemical modeling (Geochemists Workbench, Phreeqc); taught course on Computer Methods.
- *Analytical:* SIMS (trace element, stable isotopes and isotopic dating), LA-ICPMS, TGA-MS, DCP emission spectroscopy, AA spectroscopy, PIXE, RBS, gamma ray spectroscopy, EMPA, SEM, XRD.
- *Experimental petrology:* piston cylinder apparatus, cold seal pressure vessels, 1 atm. furnace, and hydrothermal diamond anvil cell.

GRADUATE STUDENT ADVISING

Advisor: PhD Students

- Tim Peters, 2006-

Advisor: Masters Students

- Crombie, Scott (2006) [Monazite alteration in the Searchlight Contact Metamorphic Aureole, Southern Nevada.](#)
- Zhang, Lichun (2005) Zircon solubility in alkaline aqueous solutions and trace element partitioning between zircon and fluids. Currently a technician in a cancer research laboratory at Duke University.
- Lehner, Stephen (2004) Synthesis and experimental study of oxidation rate of arsenian pyrite. Co-advised with Kaye Savage. Currently a PhD student in the Environmental Science option.
- Bryant, Derek (2002) Geochemical, age, and isotopic constraints on the location of the Sino-Korean/Yangtze suture and Evolution of the northern Dabie Shan, China. Currently Ph.D. student in Environmental Management at Vanderbilt University.
- Loflin, Miranda (2002) Monazite as a tracer of fluid infiltration associated with contact metamorphism. Currently works for an environmental consulting firm in Nashville.
- Gorisch, Betsy (1999) Paragenetic and geochronological characteristics of monazite, based on experimental investigations with applications to naturally occurring metamorphic rocks. Co-advised with Calvin Miller.
- Robinson, Delores (1997) Investigating magma chamber dynamics through the examination of accessory minerals: The Aztec Wash pluton, Southern Nevada. Currently a faculty member at the Univ. of Alabama. Co-advised with Calvin Miller.
- Davis, Carol J. (1996) Geologic controls on contaminant movement in a carbonate aquifer system: Arnold Air Force Base, South-Central Tennessee. M.Sc., Vanderbilt University, May 1996, 75 pp. Works for an environmental consulting firm in Louisiana.

- Dittmer, Sondra K. (1995) Element partitioning between peridotite assemblage minerals and H₂O at 2.0-3.0 Gpa and 900-1100°C. Worked with environmental consulting firm, then was Assistant Professor at Olivet Nazarene University.
- Larrieu, Theodore L. (1995) Experimental determination of the pressure-volume-temperature properties of water to 20 kbars and 1000°C. Works for Thomas Jefferson National Accelerator facility in Virginia.

Thesis Advisor: Senior Honor's Thesis & Scholarship Students

- Kelsey Biting (2004) Drinking water and reservoir water quality in the area of Coffee and Franklin Counties, TN (VUSR). Enrolled in graduate school at Rutgers Univ.
- Katy Huntze (2001) Fluid-assisted monazite recrystallization: effects on internal zoning and implications for Th-Pb age dating. Works for the Navy.
- Stacie Dunkle (2000) Imaging and Age Dating of Zircons from the Ultra-High Pressure Terrane of Dabie Shan, China. Earned her M.Sc. at VPI in 2002, then completed veterinary school at Tufts Univ.
- Kevin Giles (2000) The Effect of Fluid Interconnectivity on Monazite Growth in Fluid-bearing Quartzite. Started medical school in 2001.
- John Milleman (1998) Hydrothermal growth kinetics of monazite; with application to age determination. Completed medical school in 2005. Deceased.
- Also advised Hyen Sung, Daric Georgiades and Katie DeLaCruz on projects.

Ph.D. Committees

- Tim Peters (Advisor), Environmental Science, 2006-
- Lily Claiborne, Environmental Science, 2008-
- Josh Arnold, Environmental Engineering, 2008-
- Sonali Shukla, Physics, 2006-
- Stephen Lehner, Environmental Science, 2005-2007
- Sarynna Lopez, Environmental Engineering, 2004-6

Research Advisor: Local High School Students

- Culley Sharp, VCSO Research Internship Program, 2007
- Annalyse Moncrief, Hume Fogg, VCSO Research Internship Program, 2007
- Jason Cox, Hunters Lane, VCSO Research Internship Program, 2006
- Kathleen Goetz, Harpeth Hall, 2004-5 (Won 1st prize in Middle Tenn. Science Fair)
- Oran Switzer, Martin Luther King Science Magnet, 1994-5

POST-GRADUATE COLLABORATIONS

Post-doctoral students

- Yan Luo, May 2006 – July 2007

Visiting Professors

- Osvaldo Rabbia, Universidad de Concepcion, Chile (3/00-4/00, 9/00-10/00): Collaborative research on rutile-fluid trace element partitioning and application to geochemical exploration of ore deposits.

TEACHING

Courses Taught

- GEOL100: Environmental Geology (Summer 1999, S 2000-6)
- GEOL101: Physical Geology (S 1992-1994)
- GEOL115: Fr. Sem., Controversies in the Geosciences: Science and our Environment (F 1994-8)

- EES115: Fr. Writing Sem., Sustainability: An Environmental Science Perspective (S, F 2009)
- GEOL226: Petrology (S 2006-8)
- GEOL258: Environmental Geochemistry (F 2003)
- GEOL260: Geochemistry (F 1998, F 2000-2, F 2004, F 2006-9): <http://www.cas.vanderbilt.edu/geol260/>
- GEOL262: Geochemistry Lab (F 2006-8)
- GEOL265: Computer Methods in Geology (F 1992-1997)
- GEOL320: Aqueous Geochemistry (F 1991, S 1994-2002, F 2005, S 2009): <http://www.cas.vanderbilt.edu/geol320/>
- GEOL322: Environmental Applications of Geochemical Modeling (S 2003-4, 2007)
- GEOL390: Advanced Geochemistry (S 2005)
- GEOL390: Geochemistry of the Early Earth (S 2008)

UNIVERSITY AND DEPARTMENTAL DUTIES

- Faculty Marshall, S 2009
- Director of Graduate Studies (8/94-8/98, 6/05-8/09)
- Senior Advisory Review Committee, College of A&S (9/08-5/09)
- Task Force on Graduate Education (9/08-8/09)
- Environmental Science Option Program Advisory Committee (9/05-present)
- Department server and web administrator (8/08-8/09)
- Faculty Fellow, Sigma Phi Epsilon fraternity (2008-2009)
- Speakers Chair (9/98-9/07)
- Graduate Faculty Assembly Delegate (1993-4, 9/99-8/01, 9/04-present)
- CPC Subcommittee on Natural Science (1997-2006)
- Environmental Science Ph.D. Curriculum Committee (9/03-9/05)
- Chair, search for solid earth dynamics faculty position (9/04-4/05)
- Search committee member for external chair (9/02-4/03)
- Leadership Committee, Vanderbilt Institute for Environmental Risk and Resources Management (2002-3)
- Strategic Planning Committee, College of Arts and Science, Caucuses 4 and 5, S 2001
- Department Computer Coordinator (8/91-8/99)

PROFESSIONAL MEMBERSHIPS

Mineralogical Society of America, Geochemical Society, American Geophysical Union, Geological Society of America, International Association of Geochemistry and Cosmochemistry, Sigma Xi.

OUTREACH

- Vanderbilt Center for Science Outreach Research Internship Program 2006-7
- Venture Scholars Program, 2006
- Geological Society of America Partners in Education Program 1997-1998

PROFESSIONAL SERVICE

- Associate Editor, Geochemical Transactions of the American Chemical Society (2006-present)
- American Geophysical Union, Union Medals Committee (2004-2006)
- Mineralogical Society of America, Lecture Program Committee (2002-2006)

- Associate Editor, American Mineralogist (2001-2006)
- Chair, Sigma Xi admissions committee (2001)

RECENT INVITED TALKS AND CHAIRED SESSIONS

- Northwest University, Xi'an, China (11/08)
- Chinese Academy of Geological Sciences, Beijing, China (8/07)
- China University of Geosciences, Wuhan, China (8/07)
- Keynote speaker, Goldschmidt Conference (8/06 in Melbourne, Australia)
- Australian National University (8/06)
- Invited speaker, Goldschmidt Conference (5/05)
- Adventure Science Museum, at invitation of Vanderbilt's Center for Science Outreach (2/05)
- Invited to speak to Vanderbilt Mayfield #3 (11/04)
- Dept. of Civil and Environmental Engineering, Vanderbilt Univ. (3/03)
- Chemical Science Division, Oak Ridge National Laboratory (11/02)
- Univ. of South Carolina (3/02)
- University of Tennessee at Martin (9/01)
- Keynote speaker, Trace element partitioning symposium; Invited speaker, accessory minerals session, Goldschmidt Conference (May 2001)
- 31st International Geological Congress in Rio de Janeiro, Brazil (August 2000): chaired general symposium "Trace element mineralogy", presented poster, coauthor on talk.
- Keynote speaker, International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) workshop on Magmatic Arcs, New Zealand (January 2000)

GRANT FUNDING

Externally-funded grants

- National Science Foundation, PI, EAR-0838391, \$261,031, 6/09-6/12, Trace element partitioning between zircon, aqueous fluids and silicate melt at high and ultrahigh pressures.
- National Science Foundation, co-PI (Calvin Miller PI), EAR-0911726, \$347,475, 6/09-6/12, Supereruptions, Magma Chambers, & Plutonic Residue: Insights from Peach Spring Tuff, Significance of Sphene.
- National Science Foundation, PI (Calvin Miller co-PI), EAR-0510092, \$285,000, 6/1/05-6/1/09, Zr mineral aqueous solubilities and zircon/(fluid-melt) partitioning.
- National Science Foundation, PI (Calvin Miller co-PI), EAR-0126020, \$195,459, 1/02-1/06, Monazite as a sensitive indicator of the timing and type of fluid activity during metamorphism.
- Government of Chile, Lineas Complementarias, Project # 80000006, ~U.S. \$470,000, 10/00-10/03, P.I. Leopoldo Lopez Escobar, Co-P.I.'s Robert King and Osvaldo Rabbia, Co-researcher Laura Hernandez, Collaborator **John Ayers**, A Petro-geochemical and mineralogical investigation of the "El Teniente belt", central Chile: Implications of lower crustal melting processes and the links to giant Andean porphyry Cu-Mo mineralization.
- National Science Foundation, PI (Calvin Miller co-PI), EAR-9873626, \$170,929, 1/99-1/02, Laboratory and field investigations of monazite petrogenesis, growth kinetics, textural development, and U-Th-Pb chronometry in igneous and high-grade metamorphic rocks.
- National Science Foundation, co-PI (Calvin Miller PI), EAR-9506551, \$145,551, 7/95-7/99, Evaluating the potential of zircon and monazite in thermochronometry of high temperature crustal processes.
- National Science Foundation, EAR-931705, \$88,000, 4/94-10/96, Experimental investigation of the stability and aqueous solubility of Ti- and Zr-rich minerals: Implications for HFSE mobilities in subduction zones.

Internally-funded grants (most recent)

- Natural Science Committee, F 1999, \$8,305, Acquisition of a cold-seal pressure vessel system for measurements of rutile/fluid trace element distribution coefficients.
- University Research Council, S 1999, \$3930, Direct Research Support, Collaborative Research on the Ultra-High Pressure Rocks of Dabie Shan, China.

PUBLICATIONS

Books

Ayers J.C. (in prep.) Sustainability: Adapting to a World of Shrinking Resources.

Blog

Sustainability: <http://sustainability-ayersj.blogspot.com/>

Peer-Reviewed Journal Articles

Ayers J.C., Crombie S., Loflin M., Miller C.F., Luo Y. (in prep.) Monazite alteration in the Searchlight contact metamorphic aureole, Southern Nevada. To be submitted to *Amer. Jour. Science*.

Ayers J.C., Zhang L. (in prep.) Solubility of zircon and baddeleyite in neutral to alkaline aqueous fluids at upper crustal conditions. To be submitted to *Geochim. Cosmochim. Acta*.

Ayers J.C., Bryant D.L., Giles K. (in prep.) Effect of fluid composition on monazite solubility and growth rate at 1.0 GPa and 1000°C. To be resubmitted to *American Mineralogist*.

Rabbia O.M., Hernández L.B., French D.H., King R.W. and **Ayers J.C.** (accepted) The El Teniente porphyry Cu-Mo deposit from a hydrothermal rutile perspective. *Mineralium Deposita*.

Luo Y., **Ayers J.C.** (2009) Experimental measurements of zircon/melt trace element partition coefficients. *Geochim. Cosmochim. Acta* v. 73, 3656-3679. doi:10.1016/j.gca.2009.03.027

Luo Y., Sun M., Zhao G., Li S., **Ayers J.C.**, Xia X., Zhang J. (2008) A comparison of U-Pb and Hf isotopic compositions of detrital zircons from the North and South Liaohe Groups: Constraints on the evolution of the Jiao-Liao-Ji Belt, North China Craton. *Precambrian Research* v. 163, 279-306.

Ayers J.C., Loflin M., Miller C.F., Barton M.D., Coath C. (2006) Monazite used to determine the extent and timing of fluid infiltration in the Birch Creek Pluton metamorphic aureole. *Geology* v. 34(8), 653-656. doi: [10.1130/g22185.1](https://doi.org/10.1130/g22185.1)

Lehner S.W., Savage K., **Ayers J.C.** (2006) Vapor growth and characterization of pyrite (FeS₂) doped with Co, Ni, and As: Variations in semiconducting properties. *Journal of Crystal Growth*, v. 286, 306-317. doi: [10.1016/j.jcrysgro.2005.09.062](https://doi.org/10.1016/j.jcrysgro.2005.09.062)

Gao S., Rudnick R.L., Yuan H.-L., Liu X.-M., Liu Y.-S., Ling W.-L., **Ayers J.C.**, Wang X.-C. (2004) Recycling lower continental crust. *Nature* **432**, 892-897. doi: [10.1038/nature03162](https://doi.org/10.1038/nature03162)

Ayers, J.C., Loflin, M., Miller, C.F., Barton, M.D., and Coath, C. (2004) Dating fluid infiltration using monazite. In R.B. Wanty, and R.R. Seal II, Eds. *Proceedings of the Eleventh International Symposium on Water-Rock Interaction, Vol. 1*, p. 247-251. A.A. Balkema Publishers.

Bryant D.L., **Ayers J.C.**, Gao S., Zhang H., Miller C. (2004) Geochemical, age, and isotopic constraints on the location of the Sino-Korean/Yangtze suture and Evolution of the northern Dabie Shan, China. *GSA Bulletin* **116** (5/6), 698-717. doi: [2610.1130/B25302.2](https://doi.org/2610.1130/B25302.2)

Ayers J.C., DeLaCruz K., Miller C.F., Switzer O. (2003) Experimental study of the growth kinetics of zircon in quartzite ± H₂O at 1.0 GPa and 1000°C, with implications for geochronological studies of high-grade metamorphism. *American Mineralogist* **88**, 365-376.

Ayers J.C., Dunkle S., Gao S., Miller C. (2002) Triassic zircon U-Pb and monazite Th-Pb ages recorded in Maowu ultramafics and Shuanghe jadeite quartzite, Dabie Shan UHP belt, east-central China. *Chemical Geology* **186**, 315-331. doi: [10.1016/S0009-2541\(02\)00008-6](https://doi.org/10.1016/S0009-2541(02)00008-6)

Townsend K.J., Miller C.F., D'Andrea J.L., **Ayers J.C.**, Harrison T.M., Coath C.D. (2001) Monazite paragenesis in the Ireteba granite, southern Nevada: Geochronological implications. *Chemical Geology* **172**, 95-112. doi: [10.1016/S0009-2541\(00\)00238-2](https://doi.org/10.1016/S0009-2541(00)00238-2)

- Miller C.F., Hatcher R.D. Jr., **Ayers J.C.**, Coath C.D., Harrison T.M. (2000) Zircon age and inheritance of eastern Blue Ridge plutons, Southwestern North Carolina and Northeastern Georgia, with implications for magma genesis and evolution of the Southern Appalachian Orogen, *American Journal of Science* **300**, 142-172.
- Ayers J.C.** (2000) Source Processes: Slab dehydration, fluid-wedge interaction, and partial melting to form primitive arc lavas. In State of the Arc 2000: Processes and Timescales, extended abstracts, eds. I.E.M. Smith, J.P. Davidson, J.A. Gamble and R.C. Price, pp. 13-16.
- Ayers J.C.**, Miller C.F., Gorisch E.B., Milleman J. (1999) Textural development of monazite during high-grade metamorphism: Implications for U,Th-Pb age dating. *American Mineralogist* **84**, 1766-1780. <http://ammin.geoscienceworld.org/cgi/reprint/84/11-12/1766>
- Ayers J.C.** (1998) Trace element modeling of aqueous fluid – peridotite interaction in the mantle wedge of subduction zones. *Contributions to Mineralogy and Petrology* **132**, 390-404. doi: [10.1007/s004100050431](https://doi.org/10.1007/s004100050431)
- Ayers J.C.**, Dittmer S.K., Layne G.D (1997) Partitioning of elements between peridotite and H₂O at 2.0-3.0 GPa and 900-1100°C, and application to models of subduction zone processes. *Earth and Planetary Science Letters* **150**, 381-398. doi: [10.1016/S0012-821X\(97\)00096-4](https://doi.org/10.1016/S0012-821X(97)00096-4)
- Larrieu T.L., **Ayers J.C.** (1997) Measurements of the pressure-volume-temperature properties of fluids to 20 kbars and 1000°C: A new approach demonstrated on water. *Geochimica et Cosmochimica Acta* **61**, 3121-3134. doi: [10.1016/S0016-7037\(97\)00155-5](https://doi.org/10.1016/S0016-7037(97)00155-5)
- Ayers J.C.**, DeLaCruz K.J. (1997) Hydrothermal growth kinetics of zircon (ZrSiO₄). *Proceedings of the Fifth International Symposium on Hydrothermal Reactions*, pp. 227-231.
- Ayers J.C.**, Eggler D.H. (1995) Partitioning of elements between silicate melt and H₂O-NaCl fluids at 1.5 and 2.0 GPa pressure: Implications for mantle metasomatism. *Geochimica et Cosmochimica Acta* **59**, 4237-4246. doi: [10.1016/0016-7037\(95\)00244-T](https://doi.org/10.1016/0016-7037(95)00244-T)
- Ayers J.C.**, Watson E.B. (1993) Apatite/fluid partitioning of rare earth elements and strontium: experimental results at 1.0 GPa and 1000°C and application to models of fluid/rock interaction. *Chemical Geology* **110**, 299-314. doi: [10.1016/0009-2541\(93\)90259-I](https://doi.org/10.1016/0009-2541(93)90259-I)
- Ayers J.C.** (1993) Partitioning and mass balance relations in lherzolites. *Chemical Geology* **107**, 19-27. doi: [10.1016/0009-2541\(93\)90099-5](https://doi.org/10.1016/0009-2541(93)90099-5)
- Ayers J.C.**, Watson E.B. (1993) Rutile solubility and mobility in supercritical aqueous fluids. *Contributions to Mineralogy and Petrology* **114**, 321-330. doi: [10.1007/BF01046535](https://doi.org/10.1007/BF01046535)
- Ayers J.C.**, Brenan J.B., Watson E.B., Wark D.A., Minarik W.G. (1992) A new capsule technique for hydrothermal experiments using the piston cylinder apparatus. *American Mineralogist* **77**, 1080-1086.
- Rubin P.A., **Ayers J.C.**, Grady K.A. (1992) Solution mining and resultant evaporite karst development in Tully Valley, New York, pp. 313-328, *Proc. Third Conference on Hydrogeology, Ecology, Monitoring, and Management of Ground Water in Karst Terranes*, Water Well Journal Pub. Co., 793 pp.
- Ayers J.C.**, Watson E.B. (1991) Solubility of Apatite, Monazite, Zircon and Rutile in Supercritical Aqueous Fluids with Implications for Subduction Zone Geochemistry. *Philosophical Transactions Royal Society of London A*, **335**, pp.365-75. <http://links.jstor.org/sici?sici=0962-8428%2819910515%29335%3A1638%3C365%3ASOAMZA%3E2.0.CO%3B2-%23>
- Meen J.K., **Ayers J.C.**, Fregeau E.J. (1989) A model of mantle metasomatism by carbonated alkaline melts: trace-element and isotopic composition of mantle source regions of carbonatite and other continental igneous rocks. In *Carbonatites: Origin and Evolution* (K. Bell, ed.), pp. 464-499, George Allen and Unwin, London.
- Meen J.K., Eggler D.H., **Ayers J.C.** (1989) Evidence for very low solubility of REE in CO₂-rich fluids at mantle conditions. *Nature* **340**, 301-303.

Non Peer-reviewed

- Bitting K., **Ayers J.C.**, Savage K. (2005) Fact or fiction: The truth about water contamination in Manchester and Tullahoma, TN. In Proceedings of the Fifteenth Tennessee Water Resources Symposium, pp. 3C-20 to 3C-23, American Water Resources Association.

Popular articles about work

- Ayers J. C. (2006) Down to a science: ways to make our complex world come alive. In *The Tennessean*, Oct. 16, 2006, pp. B-3. <http://tennessean.com/apps/pbcs.dll/article?AID=/20061016/NEWS0402/610160354/1021>

Gramling C. (2006) Mineral clock not set in stone. *Geotimes* **51**(11), 14-15.

http://www.agiweb.org/geotimes/current/NN_MineralClock.html

Salisbury D. (2006) Radioactive crystals help identify and date ore deposits. In *Exploration*.

<http://www.vanderbilt.edu/exploration/stories/monazite.html>

Reports

Ayers J.C., Rubin P. (1990) *Geochemistry and Hydrogeology of Sand Volcano Effluents in Tully Valley, New York*. Environmental Protection Bureau, New York State, 112 pp.

Abstracts

Luo Y., Yin Q. Z., **Ayers J.C.**, Ryerson F. and Hutcheon I. (2009) Experimental measurements of zircon/melt trace element partition coefficients: Key issues and possible solutions. Lunar & Planetary Science Conference.

Ayers J.C., Luo Y. (2008) Experimental measurements of zircon/melt partition coefficients: potential errors associated with the development of diffusional boundary layers. GSA National meeting, [Abstract 193-28](#).

Ayers J.C., Luo Y. (2008) Use of newly measured zircon/melt partition coefficients to identify the source of Hadean zircons. *Goldschmidt Conference Abstracts 2008, Geochimica et Cosmochimica Acta*, V. 72, Issue 12, Supplement 1, pg. A39.

Ayers J.C., Luo Y. (2007) New experimental measurements of zircon/melt trace element partition coefficients. *EOS Trans. AGU*, 88, Fall Meeting Suppl., Abstract V22-08.

Ayers J.C., Crombie S., Luo Y., Miller C.F. (2006) A Tale Of Two Plutons: Using Monazite To Reconstruct The Fluid History Of Contact Metamorphic Aureoles. *EOS Trans. AGU*, 87, Fall Meeting Suppl., Abstract V31F-07.

Luo Y., **Ayers, J.C.** (2006) Trace element geochemistry of zircons from the Dabie Shan Ultrahigh-Pressure Metamorphic Belt, *EOS Trans. AGU*, 87, Fall Meeting Suppl., Abstract V33A-0628.

Ayers J.C. (2006) What can zircon and monazite tell us about metamorphic fluids? *Goldschmidt Conference Abstracts 2006, Geochimica et Cosmochimica Acta*, V. 70, Issue 18, Supplement 1, Page A26.

Crombie S., **Ayers J.C.**, Miller C.F. (2006) Monazite Alteration in the Searchlight Contact Metamorphic Aureole, Southern Nevada. *EOS Trans. AGU*, 87(36), Jt. Assem. Suppl., Abstract U41A-01.

Ayers J.C., Zhang L. (2005) Zircon/fluid trace element partitioning. *GSA Abstracts with Programs* Vol. 37, No. 7, p. 90.

Ayers J.C., Zhang L. (2005) Zircon Aqueous Solubility and Partitioning Systematics. *Goldschmidt Conference Abstracts 2005, Geochim. et Cosmochim. Acta*, V. 69, p. 5.

Zhang L., **Ayers J.C.** (2005) Investigation of baddeleyite (ZrO₂) solubility in aqueous alkaline solutions. *Goldschmidt Conference Abstracts 2005, Geochim. et Cosmochim. Acta*, V. 69, p. 18.

Ayers J.C., Bryant D.L., Giles K. (2004) Effect of fluid composition on monazite solubility, coarsening and crystal size distribution at 1.0 GPa and 1000°C, *EOS Trans. AGU*, 85(47), Fall Meeting Suppl., Abstract V21A05-88.

Lehner S.W., Savage K., **Ayers J.C.** (2004) Variations of resistivity and carrier type for synthetic pyrite doped with As, Co, and Ni: Implications for oxidation. *GSA Abstracts with Programs*.

Lehner S.W., Savage K., **Ayers J.C.** (2004) Synthesis and characterization of large Co, Ni, and As-doped pyrite crystals produced by chemical vapor transport. GSA NE and SE section meeting, March 2004.

Gao S., Rudnick R.L., Yuan H.-L., Liu X.-M., Liu Y.-S., Ling W.-L., **Ayers J.C.**, Wang X.-C. (2003) Recycling lower continental crust: evidence from high Mg andesites in the North China Craton. *EOS Trans. AGU*, 84(46), Fall Meet. Suppl., Abstract V32H-01.

Ayers J.C., Bryant D.L., Gao S., Miller C.F., Zhang H. (2003) Geochemical, age, and isotopic constraints on the location of the Sino-Korean/Yangtze suture and evolution of the northern Dabie complex, east central China. *GSA Abstracts with Programs* 34(7), 226-7.

Rabbia O.M., Hernandez L.B., King R.W., **Ayers J.C.**, Lopez-Escobar L. (2003) Chemistry of hydrothermal rutile from Cu-(Mo), Au-(Cu) and Mo porphyry systems. *Terra Nostra* 2, 61.

Ayers J.C., Loflin M.I., Miller C.F., Barton M.D., Coath C. (2002) Using monazite to map the spatial and temporal distribution of fluids during contact metamorphism: Birch Creek pluton. *GSA Abstracts with Programs* **34**, 534.

- Loflin M.I., **Ayers J.C.**, Barton M.D., Miller C.F., Coath C.D. (2002) Monazite as a tracer of fluid infiltration associated with contact metamorphism. *EOS Trans. AGU*, **83** (19), Spring Sci. Meet. Suppl., Abstract V42A-10.
- Bryant D.L., **Ayers J.C.**, Gao S., Miller C.F., Zhang H. (2002) Geochronologic constraints on the location of the Sino-Korean/Yangtze suture and evolution of the Northern Dabie Shan. *EOS Trans. AGU*, **83** (19), Spring Sci. Meet. Suppl., Abstract V42A-01.
- Ayers J. C.**, Sailor K., Miller C.F., Dunkle S., Loflin M. (2001) Evidence of fluid-assisted recrystallization of monazite. *Eleventh Annual Goldschmidt Conference Program and Abstracts*, Abstract # 3475, LPI Contribution No. 1088, Lunar and Planetary Institute, Houston (CD-ROM).
- Ayers J.C.**, Giles K. (2001) Effect of fluid composition on monazite solubility and growth systematics at 1.0 GPa and 1000°C. *Eleventh Annual Goldschmidt Conference Program and Abstracts*, Abstract # 3646, LPI Contribution No. 1088, Lunar and Planetary Institute, Houston (CD-ROM).
- Ayers J.C.**, Dunkle S., Gao S., Miller C.F. (2000) Triassic zircon U-Pb and monazite Th-Pb ages recorded in Maowu ultramafics and Shuanghe jadeite quartzite, Dabie Shan UHP belt, east-central China. *EOS Trans. AGU*, **81**(48), F1280.
- Ayers J.C.**, Gao S., Dunkle S., Miller C.F. (2000) Composition-age relationships in monazites and zircons from the Maowu ultrahigh-pressure ultramafic body, Dabie mountains, China: implications for timing and mechanism of UHP metamorphism. *31st Internat. Geol. Congress Abstr. Vol.*
- Miller C.F., **Ayers J.C.**, D'Andrea J.L. (2000) Zircon saturation temperatures, preservation of inherited zircon, and temperatures of magma generation: Implications of a paradox. *31st Internat. Geol. Congress Abstr. Vol.*
- Ayers J.C.** (2000) Source processes: slab dehydration, fluid-wedge interaction, and partial melting to form primitive arc lavas. In Smith I.E.M., Davidson J.P., Gamble J.A., Price R.C. (eds.), *State of the Arc 2000: Processes and Timescales*. Extended abstracts, pp. 13-16, The Royal Soc. of New Zealand.
- Townsend K.J., Miller C.F., **Ayers J.C.**, Harrison T.M., Coath C.D. (1999) Paragenesis of monazite in the Ireteba granite: zoning and geochronological evidence for multiple generations of fluid-induced replacement, *EOS*, **80**, S356.
- Ayers J.C.**, Miller C.F. (1998) How do monazite and zircon grow, and what do monazite and zircon U-Pb age dates mean? *GSA Abstracts with Programs* **30**, A-214.
- Ayers, J.C.**, Milleman, J., Gorisch, E.B. (1998) Experimentally determined inclusion/host relationships in accessory-mineral bearing quartzites at high-grade metamorphic conditions, *EOS* **79**, S358.
- Miller C.F., **Ayers J.C.**, Hatcher R.D., Coath C.D., Harrison T.M. (1998) Age and inheritance of eastern Blue Ridge plutons, SW North Carolina-NE Georgia, by high-resolution ion microprobe. *SE GSA Abstracts with Programs*.
- Townsend, K.J., Miller, C.F., D'Andrea, J.L., **Ayers, J.C.**, Harrison, T.M., and Coath, C.D. (1998) Monazite replacement during modification of the Ireteba granite, southern Nevada: Geochronological implications: *Geol. Soc. America*, abst. with prog. 30(7): A214.
- Ayers J.C.**, Gorisch E.B., DeLaCruz K., Milleman J., Miller C.F., Switzer O. (1997) Accessory mineral growth kinetics: experiments pertaining to high-grade metamorphism and geochronologic studies. *EOS* **78**, F783.
- Ayers J.C.** (1997) Trace-element modeling of aqueous fluid-peridotite interaction in the mantle wedge of subduction zones. *Seventh Annual Goldschmidt Conference Program and Abstracts*, pp. 9-10, LPI Contribution No. 921, Lunar and Planetary Institute, Houston.
- Miller C.F., D'Andrea J.L., **Ayers J.C.**, Coath C.D., Harrison T.M. (1997) BSE imaging and ion probe geochronology of zircon and monazite from plutons of the Eldorado and Newberry Mountains, Nevada: age, inheritance, and subsolidus modification. *EOS* **78**, F783.
- D'Andrea J.L., Miller C.F., **Ayers J.C.**, Miller J.S., Coath C.D., Harrison T.M., Faulds J.E., Wooden J.L. (1997) Peraluminous plutonism in the Colorado River Extensional Corridor, Southern NV: An unusual Cretaceous, not Miocene, intrusive episode. *Late-breaking abstract, Fall GSA meeting newsletter & website*.
- Robinson D.M., Miller C.F., **Ayers J.C.** (1997) Investigating magma chamber dynamics through the examination of accessory minerals: The Aztec Wash Pluton, Southern Nevada. *GSA Abstracts with Programs* **29**, A391.
- Gorisch E.B., **Ayers J.C.** (1997) Experimental growth and behavior of monazite with implications for natural metamorphic rocks. *Seventh Annual Goldschmidt Conference Program and Abstracts*, p. 82, LPI Contribution No. 921, Lunar and Planetary Institute, Houston.

- Ayers J.C.**, DeLaCruz K.J., Gorisch E.B., Miller C.F. (1996) Experimental measurement of the growth rate of zircon: an assessment of the importance of Ostwald Ripening during high-grade metamorphism, with implications for U-Pb chronology. *GSA Abstracts with Programs* **28**, A-357.
- Dittmer S.K., **Ayers J.C.**, Layne G.D., Hickmott D. (1995) Element partitioning between H₂O and peridotite assemblage minerals at 2.0-3.0 GPa and 900-1100°C. *Fifth Annual Goldschmidt Conference Program and Abstracts*, p. 41.
- Larrieu T.L., **Ayers J.C.** (1994) A new piston cylinder technique for measuring the pressure-volume-temperature properties of fluids. *EOS* **75**, 721.
- Dittmer S.K., **Ayers J.C.** (1994) Element partitioning between H₂O and peridotite assemblage minerals at 2.0 GPa and 1000-1100°C. *EOS* **75**, 720-721.
- Ayers J.C.**, Watson E.B. (1993) Are zircons immortal? The aqueous solubility of zircon at 1.0 GPa and 1000°C and the effect of fluid composition. *EOS* **74**, p. 344.
- Ayers J.C.**, Watson E.B. (1992) Partitioning of rare earth elements between apatite and aqueous fluids at 1.0 GPa and 1000°C. *V.M. Goldschmidt Conference Volume and Abstracts* **3**.
- Ayers J.C.**, Watson E.B. (1991) Rutile in high-pressure hydrothermal environments. *EOS* **72**, 141-142.
- Ayers J.C.**, Watson E.B. (1990) Solubility of accessory minerals in aqueous fluids at 1.0-2.8 GPa and 1000-1200°C. *GSA Abstracts with Programs* **22**, A158.
- Ayers J.C.**, Watson E.B. (1989) Solubility of accessory minerals in H₂O at upper mantle conditions. *EOS* **70**, p. 506.
- Meen J.K., Eggler D.H., **Ayers J.C.** (1989) Evidence for very low solubility of REE in CO₂-rich fluids at mantle conditions. *EOS* **69**, p. 1466.
- Ayers J.C.**, Eggler D.H. (1988) Partitioning of trace elements between silicate melts and H₂O-NaCl fluids at upper mantle pressures and temperatures. *V.M. Goldschmidt Conference Volume and Abstracts* **1**, p. 27.
- Meen J.K., **Ayers J.C.** (1989) Cryptic metasomatism and creation of melts with depleted contents of the high field strength elements: coupled effects due to infiltration of melt into harzburgite. *New Mexico Bureau of Mines and Mineral Resources Bulletin* **131**, p. 135.
- Meen J.K., **Ayers J.C.**, Fregeau E.J. (1986) The stability of Zr- and P-bearing minerals in peridotite coexisting with alkaline melts. Implications for storage of U and Th in the mantle. *Prog. with Abst.*, Geol. Ass. Canada Joint Ann. Meet. **11**, p. 101.