Curriculum Vitae

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Personal Data

Place of Birth: Oakland, Calif.

Education

1983	Ph. D., Physical Chemistry, University of Oregon, Eugene, Oregon.
1974	B. A., Chemistry-Environmental Studies, Whitman College, Walla Walla, Washington. *Magna cum laude. Phi Beta Kappa.*

Positions Held

2017	Deputy Director, School of Earth & Space Exploration, ASU
2013-2014	Interim Director, School of Earth & Space Exploration, ASU
2012-2013	Associate Director, School of Earth & Space Exploration, ASU
2007-2008	Visiting Scientist, Astrogeology Program, U.S. Geological Survey, Flagstaff, AZ
2006-2007	Associate Director, School of Earth and Space Exploration, ASU
2005-2006	Interim Associate Director, School of Earth and Space Exploration, ASU
2003-2006	Chair, Department of Geological Sciences, Arizona State University
2000-2003	Associate Chair, Department of Geological Sciences, Arizona State University
1999-2000	Visiting Adjunct Research Scientist, Astrogeology Branch, US Geological Survey, Flagstaff, AZ
1998-1999	Interim Chair, Department of Geology, Arizona State University
1997-present	Professor, School of Earth & Space Exploration, Arizona State University
1997-1998	Associate Chair, Department of Geology, Arizona State University
1991-1997	Associate Professor, Department of Geology, Arizona State University
1986-1997	Visiting Associate in Geophysics, Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, Calif.
1992-1993	Visiting Associate Professor, Center for High Pressure Research, Department of Earth & Space Science, State University of New York, Stony Brook, NY
1985-1991	Assistant Professor, Department of Geology, Arizona State University
1983-1986	Research Fellow in Geophysics, Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, Calif.
1976-1983	Research Assistant, Teaching Assistant, Department of Geology, University of Oregon, Eugene, Oregon.
1974-1976	Chemist in Polymer Physical Sciences, Dynapol Corp., Palo Alto, Calif.

Professional Activities

Group Leader, Working Group on Electrical and Chemical Transport in Minerals and Related Fluids, Mineral Physics Group, American Geophysical Union, 1988-9. Proposal Review Panel, NSF Instrumentation and Laboratory Improvement Program , 1989 and

1990. Panel Member, Workshop on the National Geomagnetic Initiative, National Academy of Science, 1992. Project Review Panel, Engineering and Geoscience Division, Office of Basic Energy Sciences, Department of Energy, 1993. NSF Site Review Team for CHiPR (Center for High Pressure Research) Science and Technology Center, 1996. AGU National Meeting Program Committee, 1993-1996. AGU Committee on Mineral and Rock Physics, 1993-1998. AGU VGP MacElwane Award Nominating Committee, 1996-1997. AGU Spring National Meeting Program Committee, Volcanology, Geochemistry, Petrology (VGP) Representative, 1998. NASA Planetary Geology and Geophysics Review Panel, 1996-1998. NASA Lunar Data Analysis Review Panel, 1999. Advisory Board *Physics and Chemistry of Minerals*, 1996-1999. NSF Earth Science Instrumentation and Facilities Review Panel, 1997-2000. Chairman, Infrastructure Development Committee, Consortium for Materials Property Research in the Earth Sciences (COMPRES) 2001 - 2004. Associate Editor, *Geochemistry, Geophysics, Geosystems (G^3)*, (electronic journal) 2003-2005. North American Editor, *Physics and Chemistry of Minerals*, 2000-2006. Member, Committee of Visitors, Basic Energy Sciences Program, Office of Science, Department of Energy, 2008. Co-Chair, Workshop on Long Range Plan for High Pressure Research in Earth Sciences, Tempe, AZ, 2009. MSA Award Committee, Mineralogical Society of America, 2010-2012. Editor, *Geochemistry, Geophysics, Geosystems (G-cubed)*, (electronic journal) 2009-2013. Distinguished Lecturer, Consortium for Materials Properties Research in the Earth Sciences (COMPRES) 2012-2013. Advisory Board *Physics and Chemistry of Minerals*, 2007-present. Executive Committee, Consortium for Materials Properties Research in the Earth Sciences (COMPRES), 2008-2014. Co-Convener, Workshop on US Large Multi Anvil Facility (LMAPF), Colorado Springs (COMPRES), 2015. Program Committee Chair, COMPRES Annual Meeting, Tamaya, NM, 2017.

Professional Affiliations

American Association for the Advancement of Science, American Geophysical Union, Mineralogical Society of America, Sigma Xi, National Association of Geoscience Teachers, Geological Society of America

Honors and Awards

NSF Presidential Young Investigator, 1987-1992
ASU Department of Geology Student Appreciation Award for Excellence in Teaching and Guidance, 1988 and 1992

Articles Published - James A. Tyburczy

Lewis, W. M., and J. A. Tyburczy, Amounts and spectral qualities of dissolved organic compounds from some freshwaters of the southeastern U. S., *Arch. Hydrobiol., 74,* 8-17, 1974.

Kronstedt, M., P. L. Dubin, and J. A. Tyburczy, Molecular weight distribution of a novel condensation polymerization: Comparison with theory, *Macromolecules, 11,* 37-40, 1978.

Bulau, J. R., H. S. Waff, and J. A. Tyburczy, Mechanical and thermodynamic constraints on fluid distribution in partial melts, *J. Geophysical Research*, 84, 6102-6110, 1979.

Tyburczy, J. A., and H. S. Waff, Electrical conductivity of molten basalt and andesite to 25 kilobars pressure: Geophysical significance and implications for charge transport and melt structure, *J. Geophysical Research*, 88, 2413-2430, 1983.

Tyburczy, J. A., J. L. Blayney, W. F. Miller, and T. J. Ahrens, Streak camera recording of shock transit times at large distances using laser illumination, *Reviews of Scientific Instruments*, *55*, 1452-1454, 1984.

Tyburczy, J. A., and H. S. Waff, High pressure electrical conductivity in molten natural silicates, *Point Defects in Minerals, Geophysical Monograph Series*, *vol. 31*, edited by R. N. Schock, pp. 78-87, American Geophysical Union, Washington, D. C., 1985.

Tyburczy, J. A., and T. J. Ahrens, Dynamic compression and volatile release of carbonates, *J. Geophysical Research*, *91*, 4730-4744, 1986.

Ahrens, T. J., N. Thadhani, A. H. Mutz, T. Vreeland, Jr., R. B. Schwarz, J. A. Tyburczy, S. L. M. Shastri, and T. C. Peng, Shock consolidation of aluminium-lithium powder, *Metallurgical Applications of Shock-Wave and High Strain Rate Phenomena,* edited by L. E. Murr, K. P. Staudhammer, and M. A. Meyers, pp. 83-106, Marcel Dekker, New York, 1986.

Tyburczy, J. A., Frisch, B., and T. J. Ahrens, Shock-induced volatile loss from a carbonaceous chondrite, *Earth and Planetary Science Letters*, *80*, 201-207, 1986.

Tyburczy, J. A., and T. J. Ahrens, Dehydration kinetics of shocked serpentine, *Proc. 18th Lunar Planet. Sci. Conf.,* edited by G. Ryder, pp. 435-441, Lunar and Planetary Institute, Houston, TX, 1988.

Gratz, A. J., J. A. Tyburczy, J. Christie, T. J. Ahrens, and P. Pongratz, Shock metamorphism of predeformed quartz, *Phys. Chem. Miner., 16*, 221-233, 1988.

Tyburczy, J. A., J. S. Huebner, R. N. Schock, S. J. Mackwell, and T. J. Shankland, Electrical and chemical transport in minerals and related fluids, in *Frontiers in Mineral Physics*, Report of the Mineral Physics Group of the American Geophysical Union, edited by T. J. Ahrens, W. A. Bassett, S. J. Mackwell, and P. F. McMillan, pp. 68-71, 1989.

Tyburczy, J. A., R. V. Krishnamurthy, S. Epstein, and T. J. Ahrens, Impact-induced devolatilization and hydrogen isotopic fractionation of serpentine: Implications for planetary accretion, *Earth and Planetary Science Letter*s, 98, 245-261, 1990.

Tyburczy, J. A., and J. J. Roberts, Low frequency electrical response of polycrystalline olivine compacts: Grain boundary transport, *Geophysical Research Letters, 17*, 1985-1988, 1990.

Roberts, J. J., and J. A. Tyburczy, Frequency-dependent electrical properties of polycrystalline olivine compacts, *Journal of Geophysical Research, 96,* 16205-16222, 1991.

Tyburczy, J. A., T. S. Duffy, T. J. Ahrens, and M. A. Lange, Shock equation of state of serpentine to 150 GPa: Implications for the occurrence of water in the Earth's lower mantle, *Journal of Geophysical Research, 96,* 18011-18027, 1991.

Tyburczy, J. A., Error propagation in gravity measurements due to station-elevation errors and vertical gravity anomaly at the center of an infinitely long, V-shaped valley, in *Geologic and gravimetric investigations of the Carefree Basin, Maricopa County, Arizona, Arizona Geological Survey Special Paper 8*, by P. L. Doorn and T. L. Péwé, Arizona Geologic Survey, Tucson, AZ, pp. 150-151, 1991.

Tingle, T. N., J. A. Tyburczy, T. J. Ahrens, and C. H. Becker, The fate of organic matter during planetary accretion: Preliminary studies of the organic chemistry of experimentally shocked Murchison meteorite, *Origins of Life and Evolution of the Biosphere, 21*, 385-397, 1992.

Roberts, J. J., and J. A. Tyburczy, The frequency dependent electrical properties of dunite as a function of temperature and oxygen fugacity, *Physics and Chemistry of Minerals, 19,* 545-561, 1993.

Roberts, J. J., and J. A. Tyburczy, Impedance spectroscopy of single and polycrystalline olivine: Evidence for grain boundary transport, *Physics and Chemistry of Minerals, 20,* 19-26, 1993.

Roberts, J. J., and J. A. Tyburczy, Frequency-dependent electrical properties of minerals and partial melts, *Surveys in Geophysics*, *15,* 239-262, 1994.

Tyburczy, J. A., No stones left unturned (Book review), *Nature, 371*, 667-668, 1994.

Chen, G., J. A. Tyburczy, and T. J. Ahrens, Shock-induced devolatilization of calcium sulfate and implications for K-T extinctions, *Earth and Planetary Science Letters, 128,* 615-628, 1994.

Tyburczy, J. A., and D. K. Fisler, Electrical conductivity of minerals and melts, pp. 185 - 208, in *Mineral Physics and Crystallography: A Handbook of Physical Constants*, AGU Reference Shelf Volume 2, edited by T. J. Ahrens, American Geophysical Union, 1995.

Tyburczy, J. A., and J. J. Roberts, Impedance spectroscopy of upper mantle Earth materials, pp. 283-288 in *Electrically Based Microstructural Characterization*, *Materials Research Society Symposium Proceedings, Volume 411*, edited by R. Gerhardt, S. R. Taylor, and E. J. Garboczi, Materials Research Society, 1996.

Tyburczy, J. A., Heads or tails? How geologists determine absolute age, pp. 31-36 (student guide) and 99-106 (teachers' guide) in *Arizona Collaborative for Excellence in the Preparation of*

Teachers (ACEPT) 1996 Summer Workshop Modules, Arizona Collaborative for Excellence in the Preparation of Teachers, Arizona State University, Tempe, AZ 1996.

Roberts, J. J. and J. A. Tyburczy, Partial-melt electrical conductivity: Influence of melt composition, *J. Geophys Res., 104,* 7055-7065, 1999.

Tyburczy, J. A., Ultrahigh-pressure Mineralogy (book review), *Eos, Trans. AGU, 80(32),* 358, 1999.

Tyburczy, J. A., Heads or tails - A learning cycle exercise on radioactive decay and age determination, *J. Geoscience Education, 48*, 585-6, 2000.

Tyburczy, J. A. and B. T. Poe, Electrical conductivity of naturally-occurring melts and other materials at high pressures, pp. 101-102, in Annual Report 2000 of the Bayerisches Geoinstitut, Universitat Bayreuth Germany, 2001.

Tyburczy, J. A., X. Xu, T. J. Ahrens, and S. Epstein, Shock-induced devolatilization and isotopic fractionation of H and C from Murchison Meteorite: some implications for planetary accretion, *Earth Planet Sci Lett., 192*, 23-30, 2001.

Gaddis, L. R., M. I. Staid, J. A. Tyburczy, B. R. Hawke, and N. E. Petro, Compositions of lunar pyroclastic deposits, *Icarus*, 161, 262-280, 2003.

Du Frane, W.L., J.J. Roberts, D.A. Toffelmier, and J. A. Tyburczy, Anisotropy of electrical conductivity in dry olivine, *Geophysical Research Letters, 32,* L24315, doi:10.1029/2005GL023879, 2005.

Hernlund, J., K. Leinenweber, K., D. Locke, and J.A. Tyburczy., A numerical model for steady-state temperature distributions in solid-medium high-pressure cell assemblies, *American Mineralogist 91,* 295-305, 2006.

Leinenweber, K., J. Mosenfelder, , T. Diedrich, E. Soignard, T.G. Sharp, J.A. Tyburczy, Y. Wang, High-pressure cells for *in situ* multi-anvil experiments, *High Pressure Research 26*, 283-292, 2006.

Toffelmier, D.A and J.A. Tyburczy, Electromagnetic detection of a 410 km deep melt layer in the southwest United States, *Nature* 447, 991-994, doi:10.1038/nature05922, 2007.

Tyburczy, J.A., Properties of rocks and minerals - The electrical conductivity of rocks, minerals and the Earth, in G. Schubert, series editor, G. David Price volume editor, *Treatise on Geophysics: Volume 2 Mineral Physics*, Elsevier Ltd., Oxford, UK, pp. 631-642, 2007.

Romano, C., B.T. Poe, J. Tyburczy, F. Nestola, Electrical conductivity of hydrous wadsleyite, *European J. Mineral. , 21(3),* 615-622, 2009.

Watson, H.C., J.J. Roberts, J.A. Tyburczy, The effect of conductive grain boundary impurities on electrical conductivity in polycrystalline olivine, *Geophys. Res. Lett., 37*, L02303, doi:10.1029/2009GL041566, 2010.

Garnero, E.J., A.K. McNamara, J.A. Tyburczy, Structure of Earth's lower mantle, in H.K. Gupta, editor, *Encyclopedia of Solid Earth Geophysics*, Springer Science+Business B.V., doi:10.1007/978-90-481-8702-7, 2011.

Leinenweber, K.D., J.A.Tyburczy, T.G. Sharp, E. Soignard, T. Diedrich, W.B. Petuskey, Y. Wang, J.L. Mosenfelder, Cell assemblies for reproducible multi-anvil experiments (the COMPRES assemblies), *American Mineralogist 97*, 353-368, doi:10.2138/am.2012.3844, 2012.

DuFrane, W.L. and J.A. Tyburczy, Deuterium-hydrogen exchange in olivine: Implications for point defects and electrical conductivity, *Geochemistry, Geophysics, Geosystems, 13(3)*, Q03004, doi:10.1029/2011GC003895, 2012.

Wang, Y. and J.A. Tyburczy, A new era in mineral physics (meeting report), *Eos, 94(5)*, 57, 2013.

Pommier, A., R.L. Evans, K. Key, J.A. Tyburczy, S. Mackwell, J. Elsenbeck, Prediction of silicate melt viscosity from electrical conductivity: A model and its geophysical implications, *Geochemistry, Geophysics, Geosystems, 14(6)*, 1685 – 1692, doi:10.1002/ggge.20103, 2013.

Tyburczy, J.A., K. Hodges, R. Arrowsmith, S. Semken, T. Sharp, E. Stump, K. Whipple, Re: Response to the David King article in *The Professional Geologist* (volume 50 number 5, Sept/Oct 2013) and to the editorial by Robert A. Stewart in the same issue. *The Professional Geologist 51(1)*, 20-21, 2014.

Wang, Y., J.A. Tyburczy, B. Li, D. Dobson, G. Fiquet, T. Irifune, Z. Jin, T. Katsura, E. Ohtani, Editors, *High-Pressure Research in Earth Science: Crust, Mantle, and Core – The Liebermann Volume*, *Physics of the Earth and Planetary Interiors, vol. 228*, March 2014.

Tyburczy, J.A., and W.L. DuFrane, Properties of rocks and minerals - The electrical conductivity of rocks, minerals and the Earth, in G. Schubert, series editor, Lars Stixrude volume editor, *Treatise on Geophysics 2nd edition: Volume 2 Mineral Physics*, pp. 661-672, Elsevier Ltd., Oxford, UK, 2015.

Pommier, A., K. Leinenweber, D.L. Kohlstedt, C. Qi, E.J. Garnero, S.J. Mackwell, J.A. Tyburczy, Experimental constraints on the electrical anisotropy of the lithosphere-asthenosphere system, *Nature 522*, 202-206 (June 11, 2015), doi:10.1038/nature14502, 2015.

Helwig, W., E. Soignard, J.A. Tyburczy, Effect of water on the high-pressure structural behavior of anorthite-diopside eutectic glass, *J. Non-Crystalline Solids, 452*, 312-319 doi: 10.1016/j.jnoncrysol.2016.08.030, 2016

Novella, D., Jacobsen, B., Weber, P.K., Tyburczy, J.A., Ryerson, F.J., DuFrane, W.L., Hydrogen self-diffusion in single crystal olivine and electrical conductivity of the Earth's mantle, *Nature Scientific Reports*, 7:5344, doi:10.1038/s41598-017-05113-6 (2017).