

PUBLICATIONS — APRIL 2017

WILLIAM D. CARLSON

ISI Web of Science *h*-index: 35

Researcher ID: A-5807-2008

[† indicates student or postdoc under my supervision]

Articles in Refereed Journals / Books:

- Carlson W D** (2017) Multicomponent diffusion in aluminosilicate garnet: Coupling effects due to charge compensation. *International Geology Review* 59:526-540.
- Carlson W D**, Wilson C R (2016) Correlation factors for impurity diffusion on the sublattice of dodecahedral sites in garnet. *Physics and Chemistry of Minerals* 43:363-369.
- Carlson W D**, Pattison D R M, Caddick M J (2015) Beyond the equilibrium paradigm: How consideration of kinetics enhances metamorphic interpretation. [Invited Centennial article] *American Mineralogist* 100:1659-1667.
- † Moore S J, **Carlson W D** (2015) Evaluation of a combined HRXCT/EBSD method for detecting epitaxial nucleation of garnet porphyroblasts. *European Journal of Mineralogy* 27:19-29.
- † Moore S J, Cesare B, **Carlson W D** (2015) Epitaxial nucleation of garnet on biotite in the polymetamorphic metapelites surrounding the Vedrette di Ries intrusion (Italian Eastern Alps). *European Journal of Mineralogy* 27:5-18.
- Carlson W D**, † Hixon J D, † Garber J M, Bodnar R J (2015) Controls on metamorphic equilibration: The importance of intergranular solubilities mediated by fluid composition. *Journal of Metamorphic Geology* 33:123-146.
- Ashley K T, **Carlson W D**, Law R D, Tracy R J (2014) Ti resetting in quartz during dynamic recrystallization: Mechanisms and significance. *American Mineralogist* 99:2025-2030.
- † Cahalan R C, † Kelly E D, **Carlson W D** (2014) Rates of Li diffusion in garnet: Coupled diffusion of Li and Y+REEs. *American Mineralogist* 99:1676-1682.
- Carlson W D**, Gale J D, Wright K (2014) Incorporation of Y and REEs in aluminosilicate garnet: Energetics from atomistic simulation. *American Mineralogist* 99:1022-1034.
- Ague J, **Carlson W D** (2013) Metamorphism as garnet sees it: The kinetics of nucleation and growth, equilibration, and diffusional relaxation. [Invited article] *Elements* 9:439-445.

Articles in Refereed Journals / Books (continued):

- † Kelly E D, **Carlson W D**, Ketcham R A (2013) Magnitudes of departures from equilibrium during regional metamorphism of porphyroblastic rocks. *Journal of Metamorphic Geology* 31:981-1002.
- † Kelly E D, **Carlson W D**, Ketcham R A (2013) Crystallization kinetics during regional metamorphism of porphyroblastic rocks. *Journal of Metamorphic Geology* 31:963-979.
- † Moore S J, **Carlson W D**, Hesse M A (2013) Origins of yttrium and rare-earth-element distributions in metamorphic garnet. *Journal of Metamorphic Geology* 31:663-689.
- † Berg C A, **Carlson W D**, Connelly J N (2013) Strain rates at high temporal resolution from curved inclusion trails in garnet, Passo del Sole, central Swiss Alps. *Journal of Metamorphic Geology* 31:243-262.
- Carlson W D** (2012) Rates and mechanism of Y, REE, and Cr diffusion in garnet. *American Mineralogist* 97:1598-1618.
- Ketcham R A, **Carlson W D** (2012) Numerical simulation of diffusion-controlled nucleation and growth of porphyroblasts. *Journal of Metamorphic Geology* 30:489-512.
- † Kelly E D, **Carlson W D**, Connelly J N (2011) Implications of garnet resorption for the Lu-Hf garnet geochronometer: An example from the contact aureole of the Makhavinekh Lake Pluton, Labrador. *Journal of Metamorphic Geology* 29:901-916.
- Carlson W D** (2011) Porphyroblast crystallization: Linking processes, kinetics, and microstructures. *International Geology Review* 53:406-445.
- Carlson W D** (2010) Dependence of reaction kinetics on H₂O activity as inferred from rates of intergranular diffusion of aluminium. *Journal of Metamorphic Geology* 28:735-752.
- Liu Y, Taylor L A, Sarbadhikari A B, Valley J W, Ushikubo T, Spicuzza M J, Kita N, Ketcham R, **Carlson W**, Shatsky V, Sobolev N V (2009) Metasomatic origin of diamonds in the world's largest diamondiferous eclogite. *Lithos* 112S:1014-1024.
- Carlson W D**, † McDowell E A, Enami M, Nishiyama T, Mouri, T (2009) Laser Raman microspectrometry of metamorphic quartz: A simple method for comparison of metamorphic pressures -- Corrigendum. *American Mineralogist* 94:1291-1292.
- † Robyr M, **Carlson W D**, Passchier C, Vonlanthen P (2009) Textural, chemical, and microstructural records during growth of snowball garnet. *Journal of Metamorphic Geology* 27:423-437.
- Mosher S, Levine J S F, **Carlson W D** (2008) Mesoproterozoic plate tectonics: A collisional model for the Grenville-aged orogenic belt in the Llano Uplift, central Texas. *Geology* 36:55-58.

Articles in Refereed Journals / Books (continued):

- Proussevitch A A, Sahagian D L, **Carlson W D** (2007) Statistical analysis of bubble and crystal size distributions: Application to Colorado Plateau basalts. *Journal of Volcanology and Geothermal Research* 164:112-126.
- Hawkins A T, Selverstone J, Brearly A J, Beane R J, Ketcham R, **Carlson W D** (2007) Origin and mechanical significance of honeycomb garnet in high-pressure metasedimentary rocks from the Tauern Window, Eastern Alps. *Journal of Metamorphic Geology* 25:565-583.
- Carlson W D**, † Anderson S D, Mosher S, † Davidow J S, † Crawford W D, † Lane E D (2007) High-pressure metamorphism in the Texas Grenville orogen: Mesoproterozoic subduction of the southern Laurentian continental margin. *International Geology Review* 49:99-119. Re-published 2008 in: *Metamorphic Conditions along Convergent Plate Junctions: Mineralogy, Petrology, Geochemistry and Tectonics*, Ernst W G and Rumble III D, eds., Bellwether Publishing Ltd., p. 719-739.
- † Hirsch D M, **Carlson W D** (2006) Variations in rates of nucleation and growth of biotite porphyroblasts. *Journal of Metamorphic Geology* 24:763-777.
- Nettles J W, Lofgren G E, **Carlson W D**, McSween H Y (2006) Extent of chondrule melting: Evaluation of experimental textures, nominal grain size, and convolution index. *Meteoritics and Planetary Science* 41:1059-1071.
- Carlson W D** (2006) Three-dimensional imaging of earth and planetary materials. [Invited "Frontiers" article] *Earth and Planetary Science Letters* 249:133-147. Intended for online viewing: <http://dx.doi.org/10.1016/j.epsl.2006.06.020>
- † McFarlane C R M, Connelly J N, **Carlson W D** (2006) Contrasting response of monazite and zircon to a high-*T* thermal overprint. *Lithos* 88:135-149.
- Carlson W D** (2006) Dana Medalist Lecture: Rates of Fe, Mg, Mn, and Ca diffusion in garnet. *American Mineralogist* 91:1-11.
- McCoy T J, **Carlson W D**, Nittler L R, Stroud RM, Bogard D D, Garrison D H (2006) Graves Nunataks 95209: A snapshot of metal segregation and core formation. *Geochimica et Cosmochimica Acta* 70:516-531.
- Ketcham R A, † Meth C, † Hirsch D, **Carlson W D** (2005) Improved methods for quantitative analysis of three-dimensional porphyroblastic textures. *Geosphere* 1:42-59.
- Vontobel P, Lehmann E, **Carlson W D** (2005) Comparison of X-ray and neutron tomography investigations of geological materials. *IEEE Transactions on Nuclear Science* 52:338-341.

Articles in Refereed Journals / Books (continued):

- † McFarlane C R M, Connelly J N, **Carlson W D** (2005) Intracrystalline redistribution of Pb in zircon during high-temperature contact metamorphism. *Chemical Geology* 217:1-28.
- † Meth C E, **Carlson W D** (2005) Diffusion-controlled synkinematic growth of garnet from a heterogeneous precursor at Passo del Sole, Switzerland. *Canadian Mineralogist* 43:157-182.
- † McFarlane C R M, Connelly J N, **Carlson W D** (2005) Monazite and xenotime petrogenesis in the contact aureole of the Makhavinekh Lake Pluton, northern Labrador. *Contributions to Mineralogy and Petrology* 148:524-541.
- Carlson W D**, † Gordon C L (2004) Effects of matrix grain size on the kinetics of intergranular diffusion. *Journal of Metamorphic Geology* 22:733-742.
- Anand M, Taylor L A, Misra K C, **Carlson W D**, Sobolev N V (2004) Nature of diamonds in Yakutian eclogites: Views from eclogite tomography and mineral inclusions in diamond. *Lithos* 77:333-348.
- Carlson W D**, Rowe T, Ketcham R A, Colbert M (2003) Geological applications of high-resolution X-ray computed tomography in petrology, meteoritics and palaeontology. In Mees F, Swennen R, Van Geet M and Jacobs P (eds.) *Applications of X-ray Computed Tomography in the Geosciences*, Geological Society of London Special Publication 215:7-22.
- † McFarlane C R M, **Carlson W D**, Connelly J N (2003) Prograde, peak, and retrograde P-T paths from aluminum in orthopyroxene: High-temperature contact metamorphism in the aureole of the Makhavinekh Lake Pluton, Nain Plutonic Suite, Labrador. *Journal of Metamorphic Geology* 21:405-423.
- † Hirsch D M, Prior D J, **Carlson W D** (2003) An overgrowth model to explain multiple, dispersed high-Mn regions in the cores of garnet porphyroblasts. *American Mineralogist* 88:131-141.
- Sahagian D, Proussevitch A, **Carlson W** (2003a) Timing of Colorado Plateau uplift: Initial constraints from vesicular basalt-derived paleoelevations; Reply [to comment of Libarkin and Chase]. *Geology* 31:192.
- Sahagian D, Proussevitch A, **Carlson W** (2003b) Analysis of vesicular basalts and lava emplacement processes for application as a paleobarometer/ paleoaltimeter; Reply [to discussion by Bondre]. *Journal of Geology* 111:502-504.
- Sahagian D, Proussevitch A, **Carlson W** (2002a) Timing of Colorado Plateau uplift: Initial constraints from vesicular basalt-derived paleoelevations. *Geology* 30:807-810.

Articles in Refereed Journals / Books (continued):

- Sahagian D, Proussevitch A, **Carlson W** (2002b) Analysis of vesicular basalts and lava emplacement processes for application as a paleobarometer/ paleoaltimeter. *Journal of Geology* 110:671-685.
- Carlson W D** (2002) Presidential Address: Scales of disequilibrium and rates of equilibration during metamorphism. *American Mineralogist* 87: 185-204.
- Ketcham R A, **Carlson W D** (2001) Acquisition, optimization, and interpretation of X-ray computed tomographic imagery: Applications to the geosciences. *Computers and Geosciences* 27:381-400.
- Rubin A E, Ulf-Møller F, Wasson J T, **Carlson W D** (2001) The Portales Valley meteorite breccia: Evidence for impact-induced metamorphism of an ordinary chondrite. *Geochimica Cosmochimica Acta* 65:323-342.
- Taylor L A, Keller R A, Snyder G A, Wang W, **Carlson W D**, Hauri E H, McCandless T, Kim K-R, Sobolev V N, Bezborodov S M (2000) Diamonds and their mineral inclusions, and what they tell us: A detailed "pull-apart" of a diamondiferous eclogite. *International Geology Review* 42:959-983.
- † Hirsch D M, Ketcham R A, **Carlson W D** (2000) An evaluation of spatial correlation functions in textural analysis of metamorphic rocks. *Geological Materials Research* 2 (article 3), 21 pp.
- Taleff E M, Leon-Salamanca T, Ketcham R, Reyes R, **Carlson W D** (2000) Non-destructive evaluation of cavitation in a warm-deformed Al-Mg material. *Materials Science and Engineering A* 15:76-84.
- Keller R A, Taylor L A, Snyder G A, Sobolev V N, **Carlson W D**, Bezborodov S M, Sobolev N V (1999) Detailed pull-apart of a diamondiferous eclogite xenolith: Implications for mantle processes during diamond genesis. Proceedings of the 7th International Kimberlite Conference, Gurney J J, Gurney J L, Pascoe M D, Richardson S H (Eds.), National Printers, South Africa, 1:397-412.
- Carlson W D**, † Denison C, Ketcham R A (1999) Visualization and quantitative analysis of igneous textures in three dimensions using high-resolution X-ray computed tomography. *Electronic Geosciences* 4 (article 3), 14 pp. [also published as *Visual Geosciences* 4:1-14]
- Brown M A, Brown M, **Carlson W D**, † Denison C (1999) Topology of syntectonic melt flow networks in the deep crust: Inferences from three-dimensional images of leucosome geometry in migmatites. *American Mineralogist* 84:1793-1818.

Articles in Refereed Journals / Books (continued):

- Philpotts A R, Brustman C M, Shi J, **Carlson W D**, † Denison C (1999) Plagioclase chain networks in slowly cooled basaltic magma. *American Mineralogist* 84:1819-1829.
- Kuebler K E, McSween H Y, **Carlson W D**, † Hirsch D (1999) Sizes and masses of chondrules and metal-troilite grains in ordinary chondrites: Possible implications for nebular sorting. *Icarus* 141:96-106.
- Carlson W D**, † Donelick RA, Ketcham R (1999) Variability of apatite fission-track annealing kinetics I: Experimental results. *American Mineralogist* 84:1213-1223.
- † Donelick RA, Ketcham R, **Carlson W D** (1999) Variability of apatite fission-track annealing kinetics II: Crystallographic orientation effects. *American Mineralogist* 84:1224-1234.
- Ketcham R, † Donelick RA, **Carlson W D** (1999) Variability of apatite fission-track annealing kinetics III: Extrapolation to geological time scales. *American Mineralogist* 84:1235-1255.
- Carlson W D** (1999) The case against Ostwald ripening of porphyroblasts. *Canadian Mineralogist* 37:403-413.
- † Chernoff C B, **Carlson W D** (1999) Trace-element zoning as a record of chemical disequilibrium during garnet growth. *Geology* 27:555-558.
- † Rougvie, J R, **Carlson W D**, Copeland P, Connelly J (1999) Late thermal evolution of Proterozoic rocks in the northeastern Llano Uplift, central Texas, *Precambrian Research*. 94:49-72.
- Carlson W D** (1998) Petrologic constraints on the tectonic evolution of the Llano Uplift. In Gilbert C, and Hogan, J P, eds., *Basement Tectonics* 12:3-27, Kluwer, Dordrecht.
- Carlson W D**, † Schwarze E T (1997) Petrological significance of prograde homogenization of growth zoning in garnet: An example from the Llano Uplift. *Journal of Metamorphic Geology* 15:631-644.
- † Chernoff C B, **Carlson W D** (1997) Disequilibrium for Ca during growth of pelitic garnet. *Journal of Metamorphic Geology* 15:421-438.
- † Denison C, **Carlson W D**, Ketcham R A (1997) Three-dimensional quantitative textural analysis of metamorphic rocks using high-resolution computed X-ray tomography: Part I. Methods and techniques. *Journal of Metamorphic Geology* 15:29-44.
- † Denison C, **Carlson W D** (1997) Three-dimensional quantitative textural analysis of metamorphic rocks using high-resolution computed X-ray tomography: Part II. Application to natural samples. *Journal of Metamorphic Geology* 15:45-57.

Articles in Refereed Journals / Books (continued):

- Carlson W D**, † Denison C, Ketcham R A (1995) Controls on the nucleation and growth of porphyroblasts: Kinetics from natural textures and numerical models. *Geological Journal* 30: 207-225.
- Carlson W D**, Reese J R (1994) Nearly pure iron staurolite in the Llano Uplift and its petrologic significance. *American Mineralogist* 79:154-160.
- Carlson W D** (1993) Mechanisms and kinetics of apatite fission-track annealing: Reply to Green et al. *American Mineralogist* 78:449-452.
- Carlson W D** (1993) Mechanisms and kinetics of apatite fission-track annealing: Reply to Kevin D. Crowley. *American Mineralogist* 78:213-215.
- Carlson W D**, † Denison C (1992) Mechanisms of porphyroblast crystallization: Evidence from high-resolution computed X-ray tomography. *Science* 257:1236-1239.
- Carlson W D** (1991) Competitive diffusion-controlled growth of porphyroblasts. *Mineralogical Magazine* 55:317-330.
- Carlson W D**, † Johnson C D (1991) Coronal reaction textures in garnet amphibolites of the Llano Uplift. *American Mineralogist* 76:756-772.
- Carlson W D** (1990) Mechanisms and kinetics of apatite fission-track annealing. *American Mineralogist* 75:1120-1139.
- † Johnson C D, **Carlson W D** (1990) The origin of olivine-plagioclase coronas in metagabbros from the Adirondack Mountains, New York. *Journal of Metamorphic Geology*, 8:697-717.
- Carlson W D** (1989) The significance of intergranular diffusion to the mechanisms and kinetics of porphyroblast crystallization. *Contributions to Mineralogy and Petrology* 103:1-24.
- † Nelis M K, Mosher S, **Carlson W D** (1989) Grenville-age orogeny in the Llano Uplift of central Texas: Deformation and metamorphism of the Rough Ridge Formation. *Geological Society of America Bulletin* 101:876-883.
- Carlson W D** (1989) Subsolidus phase equilibria near the enstatite-diopside join in CaO-MgO-Al₂O₃-SiO₂ at atmospheric pressure. *American Mineralogist* 74:325-332.
- Davidson, P M, Lindsley D H, **Carlson W D** (1988) Thermochemistry of pyroxenes on the join Mg₂Si₂O₆-CaMgSi₂O₆: A revision of the model for pressures up to 30 kilobars. *American Mineralogist* 73:1264-1266.
- Carlson W D**, Rossman, G R (1988) Vanadium- and chromium-bearing andalusite: Occurrence and optical absorption spectroscopy. *American Mineralogist* 73:1366-1369.

Articles in Refereed Journals / Books (continued):

- Carlson W D**, Swinnea J S, and † Miser D E (1988) Stability of orthoenstatite at high temperature and low pressure. *American Mineralogist* 73:1255-1263.
- † Wilkerson A, **Carlson W D**, Smith D (1988) High-pressure metamorphism during the Llano Orogeny inferred from Proterozoic eclogite remnants. *Geology* 16:391-394.
- Carlson W D** (1988) Subsolidus phase equilibria on the forsterite-saturated join $Mg_2Si_2O_6$ - $CaMgSi_2O_6$ at atmospheric pressure. *American Mineralogist* 73:232-241.
- Carlson W D** and Lindsley D H (1988) Thermochemistry of pyroxenes on the join $Mg_2Si_2O_6$ - $CaMgSi_2O_6$. *American Mineralogist* 73: 242-252.
- † Bebout G E, **Carlson W D** (1986) Fluid evolution and transport during metamorphism: Evidence from the Llano Uplift, Texas. *Contributions to Mineralogy and Petrology* 92:518-529.
- Carlson W D** (1986) Reversed pyroxene phase equilibria in CaO - MgO - SiO_2 from 925° to 1175 °C at one atmosphere pressure. *Contributions to Mineralogy and Petrology* 92:218-224.
- Carlson W D** (1986) Vanadium pentoxide as a high-temperature solvent for phase equilibrium studies in CaO - MgO - Al_2O_3 - SiO_2 . *Contributions to Mineralogy and Petrology* 92:89-92.
- Carlson W D**, † Nelis M K (1986) An occurrence of staurolite in the Llano Uplift, central Texas. *American Mineralogist* 71:682-685.
- Carlson W D** (1985) Evidence against the stability of orthoenstatite above ~1005°C at atmospheric pressure in CaO - MgO - SiO_2 . *Geophysical Research Letters* 12:409-412
- Carlson W D** (1983) The polymorphs of $CaCO_3$ and the aragonite-calcite transformation. *Reviews in Mineralogy* 11:191-225.
- Carlson W D** (1983) Aragonite-calcite nucleation kinetics: An application and extension of Avrami transformation theory. *Journal of Geology* 91:57-71.
- Carlson W D**, Rosenfeld J L (1981) Optical determination of topotactic aragonite-calcite growth kinetics: Metamorphic implications. *Journal of Geology* 89:615-63.
- Carlson W D** (1980) The calcite-aragonite equilibrium: Effects of Sr-substitution and anion orientational disorder. *American Mineralogist* 65:1252-1262.

Other Publications:

Carlson W D (2011) Book Review: *Diffusion in Minerals and Melts*; review published in *Elements* 7:141.

Rowe T, Kappelman J, **Carlson W D**, Ketcham R A, Denison C (1997) High-resolution computed tomography: A breakthrough technology for earth scientists. *Geotimes*, September 1997, p. 23-27.

Carlson W D (1990) Enstatite. *Encyclopedia of Science and Technology* (7th Edition), McGraw-Hill.

Compact Disc:

Rowe T, **Carlson W D**, Bottorff W (1993) *Thrinaxodon: Digital Atlas of the Skull*. [CD-ROM], University of Texas Press, 297 megabytes.

Books and Journal Issues Edited:

Cloos M, **Carlson W D**, Gilbert M C, Liou JG, Sorensen SS [Editors] (2007) *Convergent Margin Terranes and Associated Regions: A Tribute to W. G. Ernst*, Geological Society of America Special Paper 419, 273 pp.

Sorensen SS, **Carlson W D** [Editors] (2005) An Ernstfest Festschrift: Mineralogy and petrology of high *P/T* terranes, *P-T*-ometry, and experimental phase relations. Commemorative Issue of *American Mineralogist*, Vol. 90, No. 5-6.

Abstracts:

Abstracts of ~150 sole-authored or co-authored presentations at meetings have been published since 1980. Chronological list available upon request.