
Paul D. Asimow

*Eleanor and John R. McMillan Professor of Geology and Geochemistry
California Institute of Technology
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• *Research Interests*

Igneous petrology, thermodynamic models of magmatic processes, static and dynamic high-pressure experimental investigation of natural and synthetic materials, computational materials science

• *Education*

Ph.D., Geology, Caltech, May 28, 1997
M.S., Geology, Caltech, 1993
A.B., Geological Sciences, *summa cum laude*, Harvard, 1991

• *Positions held*

2010-2016 Professor of Geology and Geochemistry, Caltech
2005-2010 Associate Professor of Geology and Geochemistry, Caltech
1999-2005 Assistant Professor of Geology and Geochemistry, Caltech
1997-99 Postdoctoral Research Fellow, Lamont-Doherty Earth Observatory of Columbia University.
1991-97 Graduate Student, Geological and Planetary Sciences, Caltech (advisor E. M. Stolper)
1990 Research assistant, Earth and Space Sciences, UCLA (advisor W. M. Kaula).
1989 Research assistant, Earth and Space Sciences, UCLA (advisor D. D. Jackson).

• *Honors and awards*

Asimowite, new mineral, IMA 2018-102
Fellow of the Mineralogical Society of America, 2018
ASCIT Teaching Award, Caltech Undergraduate Academics and Research Council, 2017
Caltech Graduate Student Council Teaching Award, 2016
Richard P. Feynman Prize for Excellence in Teaching, 2012
Plenary lecturer, Cologne Goldschmidt Conference, 2007
James B. Macelwane Medal and Fellow of the American Geophysical Union, 2005
F. W. Clarke Medal of the Geochemical Society, 2003
Alfred P. Sloan Foundation Fellowship, 2003-2005
National Science Foundation CAREER grant, 2003-2007
Lamont-Doherty Postdoctoral Research Fellowship, 1997-1999
F. Beach Leighton Fellowship, Caltech, 1996-1997
Richard H. Jahns Teaching Prize, Caltech Geology and Planetary Science, 1995
Outstanding Student Paper, AGU Tectonophysics section, 1995 Spring Meeting
NSF Graduate Fellowship, 1991-1994
Phi Beta Kappa, 1990

• *Professional Memberships*

Mineralogical Society of America (Fellow)
American Geophysical Union (Fellow)
Geochemical Society
American Physical Society

• *Professional Service*

Associate Editor, *American Mineralogist*, 2004-2009
Associate Editor, *G³*, since 2012
Special Issue Guest Editor, PEPI and *G³*
Mineralogical Society of America MSA Award Committee
Geochemical Society Goldschmidt Medal Committee (Chair)

Paul D. Asimow

Publications

Refereed Papers (h-index 45 according to Google Scholar, 16 September 2021)

1. Kaula W. M. & Asimow P. D. (1991) Tests of random-density models of terrestrial planets. *Geophysical Research Letters*, **18**:909-912.
 2. Asimow P. D. & Wood J. A. (1992) Fluid outflows from Venus impact craters: Analysis from Magellan data. *Journal of Geophysical Research*, **97**:13643-13665.
 3. Asimow P. D., Hirschmann M. M., Ghiorso M. S., O'Hara M. J., & Stolper E. M. (1995) The effect of pressure-induced solid-solid phase transitions on decompression melting of the mantle. *Geochimica et Cosmochimica Acta*, **59**:4489-4506.
 4. Asimow P. D., Hirschmann M. M. & Stolper E. M. (1997) An analysis of variations in isentropic melt productivity. *Philosophical Transactions of the Royal Society of London, Series A*, **355**:255-281.
 5. Hirschmann M. M., Ghiorso M. S., Wasylenki L. E., Asimow P. D. & Stolper E. M. (1998) Calculations of Peridotite Partial Melting from Thermodynamic Models of Minerals and Melts. I. Methods and comparison to experiments, *Journal of Petrology*, **39**:1091-1115.
 6. Gaetani G. A., Asimow P. D. & Stolper E. M. (1998) Determination of the Partial Molar Volume of SiO₂ in Silicate Liquids at Elevated Pressures and Temperatures: a New Experimental Approach, *Geochimica et Cosmochimica Acta*, **62**:2499-2508.
 7. Asimow P. D. & Ghiorso M. S. (1998) Algorithmic Modifications Extending MELTS to Calculate Subsolidus Phase Relations, *American Mineralogist*, **83**:1127-1132.
 8. Asimow P. D. & Stolper E. M. (1999) Steady-state Mantle-Melt Interactions in One Dimension. I: Equilibrium transport and Melt focusing, *Journal of Petrology*, **40**:475-494.
 9. Hirschmann M. M., Asimow P. D., Ghiorso M. S. & Stolper E. M. (1999) Calculation of Peridotite Partial Melting from Thermodynamic Models of Minerals and Melts. III. Controls on Isobaric Melt Production and the Effect of Water on Melt Production, *Journal of Petrology*, **40**:831-851.
 10. Asimow P. D. (1999) A Model that Reconciles Major- and Trace-element Data from Abyssal Peridotites, *Earth and Planetary Science Letters*, **169**:303-319.
 11. Asimow P. D. (1999) Melting the Mantle, in H. Sigurdsson, editor, *Encyclopedia of Volcanoes*, Academic Press.
 12. Asimow P. D., Hirschmann M. M. & Stolper E. M. (2001) Calculations of Peridotite Partial Melting from Thermodynamic Models of Minerals and Melts. IV. Adiabatic Decompression and the Composition and Mean Properties of Mid-ocean Ridge Basalts, *Journal of Petrology*, **42**:963-998.
 13. Asimow P. D. (2002) Steady-state Mantle-Melt Interactions in One Dimension. II: Thermal Interactions and Irreversible Terms, *Journal of Petrology*, **43**:1707-1724.
 14. Luo S.-N., Mosenfelder J. L., Asimow P. D. & Ahrens T. J. (2002) Stishovite and its implications in geophysics: New results from shock-wave experiments and theoretical modeling, *Physics-Uspekhi*, **45**:3-7 or, in Russian, *Uspekhi Fizicheskikh Nauk* **172**:475-480.
 15. Luo S.-N., Mosenfelder J. L., Asimow P. D. & Ahrens T. J. (2002) Direct Shock Wave Loading of Stishovite to 235 GPa: Implications for Perovskite Stability Relative to Oxide Assemblage at Lower Mantle Conditions, *Geophysical Research Letters* **29**:10.1029/2002GL015627.
 16. Asimow P. D. and Langmuir, C. H. (2003) The importance of water to oceanic mantle melting regimes, *Nature*, **421**:815-820.
 17. Su Y.-J., Langmuir C. H. and Asimow P. D. (2003) PetroPlot, a plotting and data management tool set for Microsoft Excel, *Geochemistry Geophysics Geosystems* **4**:10.1029/2002GC000323.
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18. Luo S.-N., Ahrens T. J. & Asimow P. D. (2003) Polymorphism, superheating and amorphization of silica upon shock loading and release, *Journal of Geophysical Research* **108**:10.1029/2002JB002317.
 19. Luo S.-N., Tschauner O., Asimow P. D., & Ahrens T. J. (2004) A new dense silica polymorph: a possible link between tetrahedrally and octahedrally coordinated silica, *American Mineralogist* **89**(2-3):455-461.
 20. Asimow P. D., Dixon J. E. & Langmuir, C. H. (2004) A hydrous melting and fractionation model for mid-ocean ridge basalts: Application to the Mid-Atlantic Ridge near the Azores, *Geochemistry Geophysics Geosystems* **5**(1):Q01E16, doi:10.1029/2003GC000568.
 21. Staneff, G. D., Asimow P. D. & Caillat T. (2004) Synthesis and thermoelectric properties of Ce(Ru_{0.67}Rh_{0.33})₄Sb₁₂, in Nolas, G.S., Yang J., Hogan T. P. & Johnson D. C. (Eds), *Thermoelectric Materials 2003 – Research and Applications*, Materials Research Society Symposium Proceedings **793**, pp. 101-106. Warrendale, PA: Materials Research Society.
 22. Cooper K. M., Eiler J. M., Asimow P. D., & Langmuir C. H. (2004) Oxygen isotope evidence for the origin of enriched mantle beneath the mid-Atlantic Ridge, *Earth and Planetary Science Letters* **220**:297-316.
 23. Luo S.-N., Akins J. A., Ahrens T. J. & Asimow P. D. (2004) Shock-compressed MgSiO₃ glass, enstatite, olivine, and quartz: Optical emission, temperatures, and melting, *Journal of Geophysical Research*, **109**(B5):B05205, doi: 10.1029/2003JB002860.
 24. Luo, S.-N., Swift D. C, Tierney T., Xia K., Tschauner O. and Asimow P. D. (2004), Time-resolved X-ray diffraction investigation of superheating-melting behavior of crystals under ultrafast heating, in *Shock Compression of Condensed Matter--2003: Proceedings of the Conference of the American Physical Society Topical Group on Shock Compression of Condensed Matter*, edited by M.D. Furnish, Y.M. Gupta and J.W. Forbes, American Institute of Physics, AIP Conference Proceedings **706**:95-98.
 25. Akins J. A., Luo S.-N., Asimow P. D. & Ahrens T. J. (2004) Shock-induced melting of MgSiO₃ perovskite and implications for melts in Earth's lowermost mantle, *Geophysical Research Letters* **39**, L14612, doi:10.1029/2004GL020237.
 26. Asimow P. D. and Longhi J. (2004) The significance of multiple saturation points in the context of polybaric near-fractional melting, *Journal of Petrology* **45**:2349-2367, doi:10.1093/petrology/egh043.
 27. Asimow P. D. (2004) Igneous Processes, in Selley R. C., Cocks R. & Plimer I.R. (Eds.), *Encyclopedia of Geology*, Academic Press.
 28. Luo S.-N., Swift D. C, Tierney T.E. IV, Paisley D. L., Kyrala G.A., Johnson R. P., Hauer A. A., Tschauner O. and Asimow P. D. (2004) Laser-induced shock waves in condensed matter: Some techniques and applications. *High Pressure Research*, **24**(4):409-422.
 29. Tschauner O., Luo S.-N., Asimow P. D., Ahrens T. J., Swift D. C., Tierney T. E., Paisley D. L. and Chipera S. J. (2004) Shock-synthesized glassy and solid silica: intermediates between four and six-fold coordination. *High Pressure Research*, **24**(4):471-479.
 30. Zeng L., Saleeby J. B. & Asimow P. (2005) Nd isotopic disequilibrium during crustal anatexis: a record from the Goat Ranch migmatite complex, southern Sierra Nevada, California. *Geology* **33**:53-56, doi: 10.1130/G20831.1.
 31. Smith P. M. & Asimow P. D. (2005) Adiatat_1ph: a new public front-end to the MELTS, pMELTS, and pHMELTS models, *Geochemistry Geophysics Geosystems*, **6**(2):Q02004, doi:10.1029/2004GC000816.
 32. Luo S.-N., Tschauner O., Tierney T.E. IV, Swift D. C., Chipera S. J. and Asimow P. D. (2005) Novel crystalline carbon cage structure synthesized from laser-driven shock wave loading of graphite. *Journal of Chemical Physics*, **123**, 024703.
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33. Zeng L., Asimow P. D. & Saleeby J. B. (2005) Coupling of anatectic reactions and dissolution of accessory phases and the Sr and Nd isotope systematics of anatectic melts from a metasedimentary source, *Geochimica et Cosmochimica Acta* **69**(14):3671-3682.
 34. Akber-Knutson S., Steinle-Neumann G. and Asimow P. D. (2005) The effect of Al on the sharpness of the MgSiO₃ perovskite to post-perovskite phase transition. *Geophysical Research Letters* **32**(14):L14303, doi:10.1029/2005GL023192.
 35. Asimow P. D., Stein L. C., Mosenfelder J. L. and Rossman G. R. (2006) Quantitative polarized infrared analysis of trace OH in populations of randomly oriented mineral grains. *American Mineralogist* **91**:278-284.
 36. Mosenfelder J. L., Deligne N.I., Asimow P. D. and Rossman G. R. (2006) Hydrogen incorporation in olivine from 2-12 GPa. *American Mineralogist* **91**:285-294.
 37. Tschauer O., Luo S.-N., Asimow P. D. and Ahrens T. J. (2006) Recovery of stishovite structure at ambient pressure out of shock-generated amorphous silica. *American Mineralogist* **91**:1857-1862. doi: 10.2138/am.2006.2015.
 38. Miller S. A., Asimow P. D. and Burnett, D. S. (2006) Determination of melt influence on divalent element partitioning between Anorthite and CMAS melts, *Geochimica et Cosmochimica Acta* **70**:4258-4274, doi:10.1016/j.gca.2006.06.1547.
 39. Mosenfelder J. L., Sharp T. G., Asimow P. D. and Rossman G. R. (2006) Hydrogen incorporation in natural mantle olivines, in S. Jacobsen and S. van der Lee (Eds.), *Earth's Deep Water Cycle*, AGU Monograph **168**: 45-46.
 40. Baxter E. F., Asimow P. D. and Farley K. A. (2007) Grain boundary partitioning of Ar and He. *Geochimica et Cosmochimica Acta* **71**(2): 434-451. doi: 10.1016/j.gca.2006.09.011.
 41. Herzberg C., Asimow P. D., Arndt N., Niu Y., Leshner C. M., Fitton J. G., Cheadle M. J. & Saunders A. D. (2007) Temperatures in Ambient Mantle and Plumes: Constraints from Basalts, Picrites and Komatiites, *Geochemistry, Geophysics, Geosystems* **8**, Q02006. doi: 10.1029/2006GC001390.
 42. Mosenfelder J. L., Asimow P. D. and Ahrens T. J. (2007) Thermodynamic properties of Mg₂SiO₄ liquid at ultra-high pressures from shock measurements to 200 GPa on forsterite and wadsleyite. *Journal of Geophysical Research* **112**, B06208, doi:10.1029/2006JB004364.
 43. Miller, S. A., Burnett, D. S., Asimow P. D., and I. Hutcheon (2007) Experimental study of radium partitioning between anorthite and melt at 1 atm. *American Mineralogist* **92**(8-9):1535-1538.
 44. Stolper E. M. and Asimow P. D. (2007) Insights into mantle melting from graphical analysis of one-component systems. *American Journal of Science* **307**(8): 1051-1139.
 45. Kelsey, K., Stebbins J. F., Du L.-S., Mosenfelder, J. L., Asimow P. D. and Geiger, C. (2008) Cation order/disorder behavior and crystal chemistry of pyrope-grossular garnets: An ¹⁷O 3QMAS and ²⁷Al MAS NMR spectroscopic study. *American Mineralogist* **93**(1):134-143. doi: 10.2138/am.2008.2623.
 46. Baziotis I., Mposkos E. & Asimow P. D. (2008) Geochemistry of ultramafic rocks from the ultra-high pressure metamorphic Kimi complex in East Rhodope (N.E. Greece): petrological evidence from major and trace element relations and geochemical modeling. *Journal of Petrology* **85**:885-909, doi:10.1093/petrology/egn010. (*This paper awarded first prize by the Academy of Athens*)
 47. Gaetani, G. A., Asimow P. D. and Stolper, E. M. (2008) Titanium coordination and rutile saturation in eclogite partial melts at upper mantle conditions, *Earth and Planetary Science Letters* **272**:720-729, doi: 10.1016/j.epsl.2008.06.002.
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48. Herzberg C. & Asimow P. D. (2008) Petrology of some ocean island basalts: PRIMELT2.XLS software for primary magma calculation. *Geochemistry Geophysics Geosystems* **9**, Q09001, doi: 10.1029/2008GC002057.
 49. Asimow P. D., Sun D. & Ahrens T. J. (2009) Shock compression of preheated Molybdenum to 300 GPa. *Physics of the Earth and Planetary Interiors* **174**:302-308. doi:10.1016/j.pepi.2008.08.004.
 50. Mosenfelder J. L., Asimow P. D., Frost D. J., Rubie D. C. & Ahrens T. J. (2009) The MgSiO₃ system at high pressure: thermodynamic properties of perovskite, postperovskite and melt from global inversion of shock and static compression data. *Journal of Geophysical Research* **114**, B01203. Doi:10.1029/2008JB005900.
 51. Hebert L. B., Antoshechkina P., Asimow P. D. & Gurnis M. C. (2009) Emergence of a low-viscosity channel through the coupling of flow and thermodynamics in a subduction zone. *Earth and Planetary Science Letters* **278**(3-4):243-256. Doi:10.1016/j.epsl.2008.12.013.
 52. Kelsey K. E., Stebbins J. F., Singer D. M., Brown G. E., Mosenfelder J. L. and Asimow P. D. (2009) Cation field strength effects on high pressure aluminosilicate glass structure: Multinuclear NMR and La XAS results. *Geochimica et Cosmochimica Acta* **73**:3914-3933. doi:10.1016/j.gca.2009.03.040.
 53. Zeng L., Liang F., Asimow P. D., Chen F. and Chen J. (2009) Partial melting of deeply subducted continental crust and the formation of quartzofeldspathic polyphase inclusions in the Sulu UHP eclogites. *Chinese Science Bulletin* **54**:2580-2594. Doi: 10.2007/s11434-009-0426-6.
 54. Bézou A., Escrig S., Langmuir C. H., Michael P. J. & Asimow P. D. (2009) Origins of chemical diversity of back-arc basin basalts: a segment-scale study of the Northern Eastern Lau Spreading Center. *Journal of Geophysical Research* **114**:B06212. Doi: 10.1029/2008JB005924.
 55. Kelsey K. E., Stebbins J. F., Mosenfelder J. L. and Asimow P. D. (2009) Simultaneous aluminum, silicon, and sodium coordination changes in 6 GPa sodium aluminosilicate glasses. *American Mineralogist* **94**:1205-1215, doi: 10.2138/am.2009.3177.
 56. Tschauner O., Asimow P. D., Kostandova N., Ahrens T. J., Sinogeikin S., Ma C., Liu Z., Fakra S. and Tamura N. (2009) Ultrafast growth of wadsleyite in shocked melts – implications for accretion rates in the solar nebula. *Proceedings of the National Academy of Science* **106**:13691-13695, doi: 10.1073/pnas.0905751106.
 57. Hebert L. B., Asimow P. D. and Antoshechkina, P. (2009) Fluid source-based modeling of melt initiation within the subduction zone mantle wedge: Implications for geochemical trends in arc lavas. *Chemical Geology* **266**(3-4):306-319. Doi: 10.1016/j.chemgeo.2009.06.017.
 58. Dauphas N., Craddock P. R., Asimow P. D., Bennett V. C., Nutman A. P. and Ohnenstetter D. (2009) Iron isotopes may reveal the redox conditions of mantle melting from Archean to present. *Earth and Planetary Science Letters* **288**(1-2):255-267. Doi:10.1016/j.epsl.2009.09.029.
 59. Fat'yanov O. V., Asimow P. D. and Ahrens T. J. (2010) Shock temperatures of preheated MgO, in *Shock Compression of Condensed Matter—2009: Proceedings of the Conference of the American Physical Society Topical Group on Shock Compression of Condensed Matter*.
 60. Ahrens T. J., Asimow P. D. and Mosenfelder J. L. (2010) Advances in shock compression of mantle minerals and implications, in *Shock Compression of Condensed Matter—2009: Proceedings of the Conference of the American Physical Society Topical Group on Shock Compression of Condensed Matter*.
 61. Asimow, P. D. and Ahrens T. J. (2010) Shock compression of liquid silicates to 125 GPa: the anorthite-diopside join. *Journal of Geophysical Research* **115**:B10209. Doi: 10.1029/2009JB0007145.
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62. Wang Z. R., Eiler J. M., Asimow P. D., Garcia M. O. and Takahashi E. (2010) Oxygen isotope constraints on the structure and evolution of the Hawaiian plume. *American Journal of Science* **310**(8): 683-720. Doi: 10.2475/08.2010.01.
 63. Balta J. B., Asimow P. D. and Mosenfelder J. L. (2011) Hydrous, low-carbon melting of garnet peridotite. *Journal of Petrology* **52**(11):2079-2105. Doi:10.1038/petrology/eg4040.
 64. Balta J. B., Asimow P. D. and Mosenfelder J. L. (2011) Manganese partitioning during hydrous melting of peridotite. *Geochimica et Cosmochimica Acta* **75**:5819-5833. Doi:10.1016/j.gca.2011.05.026.
 65. Balta J. B., Beckett J. R. and Asimow P. D. (2011) Thermodynamic properties of alloys of gold-74/palladium-26 with variable amounts of iron and the use of Au-Pd-Fe alloys as containers for experimental petrology. *American Mineralogist* **96**(10):1467-1474. Doi:10.2138/am.2011.3637.
 66. Mosenfelder J. L., Le Voyer M., Rossman G. R., Guan Y., Bell D. R., Asimow P. D. and Eiler J. M. (2011) Analysis of hydrogen in olivine by SIMS: Evaluation of standards and protocol. *American Mineralogist* **96**(11-12):1725-1741.
 67. Lund D. C. and Asimow P. D. (2011) Does sea level influence mid-ocean ridge magmatism on Milankovitch timescales? *Geochemistry Geophysics Geosystems*. **12**, Q12009. Doi: 10.1029/2010GC003693.
 68. Lee S. K., Park S. Y., Kim H.-I., Tschauner O., Asimow P. D., Bai L., Xiao Y. & Chow P. (2012) Structure of shock compressed model basaltic glass: Insights from O K-edge X-ray Raman scattering and high-resolution ²⁷Al NMR spectroscopy. *Geophysical Research Letters* **39**, L05306. Doi:10.1029/2012GL050861.
 69. Asimow P. D. (2012) Shock compression of preheated silicate liquids: apparent universality of increasing Grüneisen parameter upon compression, in *Shock Compression of Condensed Matter—2011: Proceedings of the Conference of the American Physical Society Topical Group on Shock Compression of Condensed Matter*. American Institute of Physics Conference Proceedings **1426**: 887-890. Doi:10.1063/1.3686420.
 70. Leng W., Gurnis M. C. and Asimow P. D. (2012) From basalts to boninites: the geodynamics of volcanic expression during subduction initiation. *Lithosphere* **4**(6):511-523. Published online October 26, 2012. Doi: 10.1130/L215.1.
 71. Thomas C. W., Liu Q., Agee C. B., Asimow P. D. and Lange R. A. (2012) Multi-technique equation of state for Fe₂SiO₄ melt and the density of Fe-bearing silicate melts from 0-161 GPa. *Journal of Geophysical Research* **117** B10206. Doi:10.1029/2012JB009403. *Editor's Highlight*.
 72. Hamecher E. A., Antoshechkina P. M., Ghiorso M. S. and Asimow P. D. (2013) The molar volume of FeO-MgO-Fe₂O₃-Cr₂O₃-Al₂O₃-TiO₂ spinels. *Contributions to Mineralogy and Petrology* **165**:25-43. Doi: 10.1007/s00410-012-0790-0.
 73. Herzberg C., Asimow P. D., Ionov D. A., Vidito C., Jackson M. G. & Geist D. (2013) Nickel and helium evidence for melt above the core mantle boundary. *Nature* **493**: 393-397. Doi:10.1038/nature11771.
 74. Farley K. A., Hurowitz J. A., Asimow P. D., Jacobson N. S. and Cartwright J. A. (2013) A double-spike method for K-Ar measurement: a technique for high precision in-situ dating on Mars and other planetary surfaces. *Geochimica et Cosmochimica Acta*, **110**(1):1-12. Doi: 10.1016/j.gca.2013.02.010.
 75. Kim Y. H., Clayton R. W., Asimow P. D. & Jackson, J. M. (2013) Generation of talc in the mantle wedge and its role in subduction dynamics in Central Mexico. *Earth and Planetary Science Letters* **384C**:81-87. Doi: 10.1016/j.epsl.2013.10.006.
 76. Thomas C. W. and Asimow P. D. (2013) Pre-heated shock experiments in the molten CaAl₂Si₂O₈-CaFeSi₂O₆-CaMgSi₂O₆ ternary: a test for linear mixing of liquid volumes at high
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- pressure and temperature. *Journal of Geophysical Research: Solid Earth* **118**:3354-3365. Doi:10.1002/jgrb.50269.
77. Thomas C. W. and Asimow P. D. (2013) Direct shock compression experiments on premolten forsterite and progress towards a consistent high-pressure equation of state for CaO-MgO-Al₂O₃-SiO₂-FeO liquids. *Journal of Geophysical Research: Solid Earth* **118**. Doi:10.1002/jgrb.50374.
78. Le Voyer M., Asimow P. D., Mosenfelder J. M., Guan Y., Wallace P. J., Schiano P., Stolper E. M. & Eiler J. M. (2014) Zonation of H₂O and F concentrations around melt inclusions in olivines. *Journal of Petrology*, online access 1/29/14. Doi:10.1093/petrology/egu003.
79. Sun D., Miller M. S., Piana Agostinetti N., Asimow P. D. & Li D. (2014) High frequency seismic waves and slab structures beneath Italy. *Earth and Planetary Science Letters* **391**:212-223, doi:10.1016/j.epsl.2014.01.034.
80. Baziotis I., Mposkos E. and Asimow P. D. (2014) Geochemistry of Eclogite Protoliths from the Kechros Complex in the Eastern Rhodopes (N.E. Greece). *International Journal of Earth Sciences* **103**(4):981-1003. Doi: 10.1007/s00531-014-1007-8.
81. Fat'yanov O. V. & Asimow P. D. (2014) MgO melting curve constraints from shock temperature and rarefaction overtake measurements in samples preheated to 2300 K, in *Shock Compression of Condensed Matter 2013. J. Phys.: Conf. Ser.* **500** 062003 doi:10.1088/1742-6596/500/6/062003.
82. Nguyen J. H., Akin M. C., Chau R., Fratanduono D. E., Ambrose W. P., Fat'yanov O. V., Asimow P. D. & Holmes N. C. (2014) Molybdenum sound velocity and shear modulus softening under shock compression. *Physical Review B* **89**:174109. Doi:10.1103/PhysRevB.89.174109.
83. Zhao J.-H. & Asimow P. D. (2014) Neoproterozoic boninite-series rocks in South China: a depleted mantle source modified by sediment-derived melt. *Chemical Geology*, **388**:98-111. Doi: 10.1016/j.chemgeo.2014.09.004.
84. Asimow P. D. (2015) Dynamic Compression, in Gerald Schubert (editor-in-chief) *Treatise on Geophysics, 2nd edition*, Oxford: Elsevier. pp. 393-416. ISBN 978-0-444-53802-4.
85. Herzberg C. T. & Asimow P. D. (2015) PRIMELT3 MEGA.XLSM software for primary magma calculations: Primary magma MgO contents from the liquidus to the solidus. *Geochemistry Geophysics Geosystems* **16**: 563-578. Doi: 10.1002/2014GC005631.
86. Harvey J.-P., Gheribi A. E. & Asimow P. D. (2015) A self-consistent optimization of multicomponent solution properties: ab initio molecular dynamic simulations and the MgO-SiO₂ miscibility gap under pressure. *Geochimica et Cosmochimica Acta*, **161**:146-165. Doi: 10.1016/j.gca.2015.04.004.
87. Wolf A. S., Asimow P. D. & Stevenson D. J. (2015) Coordinated Hard Sphere Mixture (CHaSM): A simplified model for oxide and silicate melts at mantle pressures and temperatures. *Geochimica et Cosmochimica Acta* **163**: 40-58. Doi: 10.1016/j.gca.2015.04.018.
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Paul D. Asimow

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- Biasi J., Bucholz C. E. & Asimow P. D. (2017) Death of a subduction zone: Alkaline volcanism on the Antarctic Peninsula. *IAVCEI 2017*, Portland, OR.
- Asimow P. D., Akin M. C., et al. (2017) Phase transitions and melting on the Hugoniot of Mg₂SiO₄ forsterite: new diffraction and temperature results. *2017 American Physical Society Topical Group meeting on Shock Compression of Condensed Matter*, St. Louis, MO.
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- Asimow P. D. (2017) The equation of state of silicate melts at lower mantle pressure. *2017 V. M. Goldschmidt Conference*, Paris, France.
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- Baziotis I., Asimow P. D., Hu J., Ferrière L., Ma C., Cernok A., Anand, M. & Topa D. (2018) High pressure polymorphs in the Château-Renard (L6) ordinary chondrite: implications for collisions on its parent body. *49th Lunar and Planetary Science Conference*.
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Paul D. Asimow

- Mitchell R. N., Cox G. M., O'Rourke J. G., Li Z.-X., Spencer C., Kirscher U., Zhang N., Murphy J. B., Nordsvan A. & Asimow P. D. (2018) Did Earth's first supercontinent form the inner core? *2018 V. M. Goldschmidt Conference*, Boston, MA.
- McCart S., Mudahy A., Lund D., Lewis M. & Asimow P. D. (2018) Evidence of anomalous Pacific-Antarctic Ridge volcanism during the penultimate glacial termination. *2018 V. M. Goldschmidt Conference*, Boston, MA.
- Lewis M. J., Asimow P. D., Maurice A. & Fischer W.W. (2018) REE budget in a Neoproterozoic iron formation dominated by accessory apatite: Wadi Karim BIF, Eastern Desert, Egypt. *Geological Society of America Annual Meeting*, Indianapolis, IN.
- Azer M. K., Abdelfadil K. M., Asimow P. D. & Khalil A. E. S. (2018) The Homrit-Waggat granitoids of the Eastern Desert of Egypt and the transition from subduction-related to post-collisional magmatism in the north Arabian-Nubian Shield. *International Conference on Earth Science & Geo Science 2018*, Amsterdam, Netherlands.
- Azer M. K., Asimow P. D. & Mubarak H. S. (2018) An integrated field, petrographic, and geochemical study of the Wadi Mikbi mafic-ultramafic intrusion and the question of layered vs. Alaskan-type intrusions. *Annual Meeting of the Egyptian Geological Society*.
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- Antoshechkina P. M., Shorttle O., Ghiorso M. S. & Asimow P. D. (2018) Recent developments in calibration of the pMELTS+CO₂ model of silicate phase equilibria. *American Geophysical Union 2018 Fall Meeting*, Washington DC. Abstract DI33B-0041.
- Grose C. J. & Asimow P. D. (2018) Non-equilibrium thermodynamic modeling of mantle melting and phase transformation. *American Geophysical Union 2018 Fall Meeting*, Washington DC. Abstract V51B-0112.
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- Mitchell R. N., Cox G. M., O'Rourke J. G., Li Z.-X., Spencer C. J., Kirscher U., Zhang N., Murphy J. B., Nordsvan A. & Asimow P. D. (2018) Did Earth's first supercontinent form the inner core? *American Geophysical Union 2018 Fall Meeting*, Washington DC. Abstract DI21B-0015.
- Biasi J., Asimow P. D. & Harris R. A. (2018) The beginning of the Brooks Range and opening of the Canada Basin: Evidence from the Brooks Range Ophiolite. *American Geophysical Union 2018 Fall Meeting*, Washington DC. Abstract T43I-0531.
- Asimow P. D., Pardo O. S. & Hu J. (2018) Sound speed and temperature in shock-compressed silicate liquids: direct constraints on Grüneisen parameters and heat capacities. *American Geophysical Union 2018 Fall Meeting*, Washington DC. Abstract MR31A-06.
- Kim D., Tracy S. J., Berryman E. J., Han S. K., Smith R. F., Gleason A. E., Bolme C. A., Appel K., Schoelmerich M., Prakapenka V. B., Lee H. J., Nagler B., Asimow P. D., Akin M. C., Eggert J. H. & Duffy T. S. (2019) X-ray diffraction study of laser-shocked forsterite (Mg₂SiO₄) from 20-130 GPa. *2019 American Physical Society Topical Group meeting on Shock Compression of Condensed Matter*, Portland, OR.
- Asimow P. D., Hu J., Pardo O., Su C. & Ma X. (2019) Shock velocity, sound speed, and Hugoniot temperature in silicate liquids to 100 GPa. *2019 American Physical Society Topical Group meeting on Shock Compression of Condensed Matter*, Portland, OR.
- Asimow P. D., Hu J., Ma C. & Bindi L. (2019) First experimental synthesis of Al₆₂Cu₃₁Fe₇ icosahedral quasicrystals and their natural origin in a meteorite by impact processes. *2019 American Physical Society Topical Group meeting on Shock Compression of Condensed Matter*, Portland, OR.
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Paul D. Asimow

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- Lock S. J., Stewart S. T., Chidester B. A. & [Asimow P. D.](#) (2019) Giant impacts stochastically change the internal pressures of terrestrial planets. *2019 V. M. Goldschmidt Conference*, Barcelona, Spain.
- Zhao J.-H. & [Asimow P. D.](#) (2019) Ca. 650 Ma mafic-ultramafic dike swarms in South China. *2019 V. M. Goldschmidt Conference*, Barcelona, Spain.
- Kim D., Tracy S. J., Berryman E. J., Han S., Smith R. F., Gleason A. E., Bolme C., Appel K., Schölmerich M., Prakapenka V. B., Lee H. J., Nagler R., [Asimow P. D.](#), Akin M. C., Eggert J. & Duffy T. S. (2019) X-ray Diffraction Study of Laser-shocked Forsterite (Mg_2SiO_4) from 20-130 GPa. *American Geophysical Union 2019 Fall Meeting*, San Francisco, CA.
- [Asimow P. D.](#), Zhou Y., Pardo O. & Hu J. (2019) Beyond the Mie-Grüneisen Approximation: Building a Better Thermal Equation of State for Silicate Liquids at Lower Mantle Pressures. *American Geophysical Union 2019 Fall Meeting*, San Francisco, CA.
- Antoshechkina P. M., Popov A., Weidendorfer D., Shorttle O. & [Asimow P. D.](#) (2019) The formation and evolution of alkaline-carbonatite magmatic systems, as modeled with rhyolite-MELTS. *American Geophysical Union 2019 Fall Meeting*, San Francisco, CA.
- Zhou Y., [Asimow P. D.](#) & Goddard W. A. III (2019) An Internal Energy dependent Grüneisen Parameter Model from Molecular Dynamics Simulations. *American Geophysical Union 2019 Fall Meeting*, San Francisco, CA.
- Grose C. J. & [Asimow P. D.](#) (2019) Phase Field Methods for Grain-Scale Kinetics in Geodynamic Systems and Geomaterials. *American Geophysical Union 2019 Fall Meeting*, San Francisco, CA.
- Baziotit I., Xydous S., [Asimow P. D.](#), Mavrogonatos K., Flemetakis S., Papoutsas A., Klemme S. & Berndt J. (2020) Phosphorus-rich olivines in a composite xenolith from Morocco: implications for growth processes. *European Geosciences Union General Assembly*, Vienna, Austria.
- [Asimow P. D.](#) & Zhou Y. (2020) A simple volume and energy-dependent for the Grüneisen parameter of silicate liquids. *V. M. Goldschmidt Conference*, Virtual.
- Horton F., Kurz M., Curtice J., [Asimow P. D.](#) & Farley K. (2020) Neon Isotopes Indicate that Baffin Island and Iceland Lavas Share a Common Origin. *V. M. Goldschmidt Conference*, Virtual.
- Antoshechkina P., Riches A., Popov A. & [Asimow P. D.](#) (2020) Revisiting Namibian Magmatism with Rhyolite-Melts and the Magma Chamber Simulator. *V. M. Goldschmidt Conference*, Virtual.
- Bhattacharjee S., Ryb U., Eiler J. M. & [Asimow P. D.](#) (2020) Structural and Isotopic Reordering in Magnesite: Insights from Heating Experiments. *V. M. Goldschmidt Conference*, Virtual.
- Hu J. & [Asimow P. D.](#) (2020) Reproducing the high-pressure metallic, oxide and silicate minerals found in meteorites using novel shock-recovery experiments. *Japan Geoscience Union – American Geophysical Union Joint Meeting*, Virtual.
- Xydous S., Papoutsas A., Baziotis I., Hu J., Ma C. & [Asimow P. D.](#) (2020) High-pressure clinopyroxene formation in L6 chondrites (Ozerki, Chug-Chug-011): implications for impact processes. *Europlanet Science Conference*.
- Swindle C., [Asimow P. D.](#) & Antoshechkina P. M. (2020) A volume model for monoclinic amphiboles. *AGU Fall Meeting*. Virtual.
- Lock S. J. & [Asimow P. D.](#) (2020) A tectonically active early Earth driven by the tidal recession of the Moon. *AGU Fall Meeting*. Virtual.
- Kim D., Tracy S. J., Smith R. F., Gleason A. E., Bolme C. A., Prakapenka V. B., Appel K., Speziale S., Wicks J. K., Berryman E. J., Han S. K., Schölmerich M. O., Lee H. J., Nagler R., Cunningham E. F., Akin M. C., [Asimow P. D.](#), Eggert J. H. & Duffy T. S. (2020) Femtosecond X-ray Diffraction of Laser-shocked Forsterite (Mg_2SiO_4) to 122 GPa. *AGU Fall Meeting*. Virtual.
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Paul D. Asimow

- Lewis M. J., Asimow P. D., Lund D. C. & McCart S. (2020) Multiple Sills Tapped by a Series of Explosive Eruptions from the East Pacific Rise. *AGU Fall Meeting*. Virtual.
- Asimow P. D. (2020) Combining computational and experimental approaches to the thermal equation of state of silicate liquids. *AGU Fall Meeting*. Virtual.
- Nguyen J. H., Akin M. C. & Asimow P. D. (2021) Experiments and Simulations of Shocked and Ramp-Compressed Metals to 5 Mbars. *American Physical Society March Meeting*, Virtual.
- Baziotis I., Ferrière L., Asimow P. D., Anand M., Xydous S., Papoutsas A. & Topa D. (2021) A unique mineral assemblage recording shock conditions in Kakowa (L6) ordinary chondrite. *Lunar and Planetary Science Conference LXII*, Virtual.
- Xydous S., Baziotis I., Bizimis M., Klemme S., Berndt J., Asimow P. D. (2021) Identifying the components of Milos Island subvolcanic plumbing system (South Aegean Volcanic Arc, Greece): An amphibole perspective. *European Geophysical Union General Assembly*.
- Grose C. J. & Asimow P. D. (2021) Computational Thermodynamics Models of Geomaterials Evolution using Phase Field. *Goldschmidt Conference, Conference*, Lyon, France.
- Walton C. R., Shorttle O., Černok A., Baziotis I., Asimow P. D., Ferrière L., & Anand M. (2021) Phosphorus-Olivine-Assemblages (POAs): a paragenetic model for P-bearing phases in primitive meteorites. *Meteoritical Society Annual Meeting*, Chicago.
- Baziotis I., Xydous S., Papoutsas A., Hu J., Ma C., Ferrière L., Klemme S., Berndt J. & Asimow P. D. (2021) Discovery of high-pressure polymorphs in the recent fall, Viñales (L6 ordinary chondrite): Implications for collisions in its parent body. *Meteoritical Society Annual Meeting*, Chicago.
- Antoshechkina P., Riches A., & Asimow P. D. (2021) Modeling Picrite-Rhyolite Magmatism at Spitzkoppe, Western Namibia, using alphaMELTS 2 and the Magma Chamber Simulator. *GSA Annual Meeting*, Portland, OR.
- McCart S., Lund D., Lewis M. J. & Asimow P. D. (2022) Assessing glacial-interglacial variability in mid-ocean ridge magmatism: New submarine volcanic ash records from the East Pacific Rise and Pacific-Antarctic Ridge. *Ocean Sciences Meeting*, Honolulu, HI.

Theses

- Asimow P. D. (1997) A Thermodynamic Model of Adiabatic Melting of the Mantle, Ph.D. Thesis, California Institute of Technology. Advisor E. M. Stolper. Published on microfilm by UMI and available digitally on the Caltech library website.
- Asimow P. D. (1991) Fluid outflows from Venus impact craters: Analysis from Magellan Data, A.B. Honors Thesis, Harvard University. Advisor J. A. Wood.

Synergistic Activities

- Development of algorithms and interfaces for extending the MELTS algorithm of Ghiorso and Sack to subsolidus, fractional, isentropic, H₂O-buffered, and multiple liquid calculations. Latest public version available at <http://magmasource.caltech.edu>
- Development of Microsoft Excel front-ends to the PRIMELT series of primary melt calculations
- Development of Java software package for teaching principles of binary phase equilibria, available online at <http://expet.gps.caltech.edu/~asimow/Binary.html>

Postdoctoral scholars advised

- | | |
|--|---|
| Jed Mosenfelder, 1999-2002 | Ethan Baxter (with Ken Farley), 2000-2002 |
| Kari Cooper (with John Eiler), 2001-2002 | Paula May Smith (with Ed Stolper), 2003-2006 |
| Kanani K. M. Lee, 2004-2005 | Oleg V. Fat'yanov, 2006-2010 |
| Sofia Akber-Knutson (with T. J. Ahrens and W. A. Goddard III), 2004-2006 | |
| Jean-Philippe Harvey, 2013-2014 | Oliver Shorttle (with E. M. Stolper), 2015-2016 |
-

Paul D. Asimow

Claire Bucholz (with J. M. Eiler), 2015-2017
Jinping Hu, 2016-2020
Simon Lock, 2018-2021

Chris Grose, 2016-2021
Daniel Weidendorfer, 2017-2019

Graduate students advised

Sheng-Nian Luo, Geophysics, Ph.D. 2003
Geoffrey Staneff, Materials Science, Ph.D. 2004
Laura Baker Hebert, Geochemistry, Ph.D. 2008
Emily Hamecher, Geology, Ph.D. 2013
Aaron Wolf, Planetary Science, Ph.D. 2013
Joe Biasi, Geochemistry, Ph.D. 2021
Yacong (Brooke) Zhou, Chemistry, 6th year
Emily Miaou, Geochemistry, 3rd year
Surjyendu Bhattacharjee, Geochemistry, 2nd year
Weiyi Liu, Geochemistry, 1st year
Juan Hernández, Geologym, 1st year

Joseph A. Akins, Geophysics, Ph.D. 2003
Sarah Miller, Geochemistry, Ph.D. 2006
Brian Balta, Geology, Ph.D. 2009
Claire Thomas, Geology, Ph.D. 2013
Natalia V. Solomatova, Geophysics, Ph.D. 2017
Madeline Lewis, Geochemistry, Ph.D. 2021
Carl Swindle, Geology, 3rd year
Ruolin Deng, Geology, 2nd year
MJ Wilner, Geology, 1st year
Ben Thyer, Geology, 1st year

Teaching

Ge 1, Earth and Environment
Ge 101, Introduction to geology and geochemistry
Ge 116, Analytical methods in geology and geochemistry
Ge 212, Thermodynamics of geological systems
Ge 215, Advanced topics in petrology

Caltech Committees

GPS Division, ongoing: Safety Committee (chair); Committee on Diversity, Equity and Inclusion (chair), C. Bucholz tracking committee

GPS Division, past: Division Seminar Organizer 2000-2002, Postdocs and Visiting Associates Committee 1999-2004, Academic Committee (Option Representative for Geology) 2007-2014, Geophysics Search Committee 2005, Core Committee 2007-2008 and 2018-2020, Long-range Planning Committee 2008, *ad hoc* Geochemistry Faculty Hiring Committee 2009, M. P. Lamb Tenure Committee 2013, J. P. Ampuero Tenure Committee 2015, General Faculty Search Committee 2013-2016, Geology Search Committee 2014-2016, C. Frankenburg Tracking Committee 2015-2018, K. Batygin tenure Committee 2019

Institute: Freshman Admissions Committee (chair, 2016-2019), Administrative Committee on Performing and Fine Arts (chair 2013-2018), Student Life and Housing Committee (chair 2009-2016), Aims and Needs Committee 2008-09, *ad hoc* Committee on Rotation (2009-10), Distinguished Alumni Awards Selection Committee (2009-2015), Conduct Review Committee, Program Committee for the Bechtel Residence (2012), Feynman Prize Committee (2012-2017), Identity Project Cabinet (2013), *ad hoc* Committee on Undergraduate Self-Governance (chair, 2014), Search Committee for Vice President for Student Affairs (2015), Search Committee for Graduate Dean (2015), Clauser prize Committee (2015-), Search Committee for Concert Band Director (chair, 2016), Faculty Board (2016-2019), Faculty Board Steering Committee (2016-2019), Search Committee for Orchestra Director (chair, 2019)
