Site-specific dehydration of olivines from San Carlos and Kilauea Iki

Bibliography

- Bell, D.R. and Rossman, G.R. (1992) Water in Earth's mantle: The role of nominally anhydrous minerals. *Science* **255**, 1391–1397.
- Bell, D.R., Rossman, G.R., Maldener, J., Endisch, D. and Rauch, F. (2003) Hydroxide in olivine: A quantitative determination of the absolute amount and calibration of the IR spectrum. *J. Geophys. Res. Solid Earth* **108**.
- Berry, A.J., Hermann, J., O'Neill, H.S.C. and Foran, G.J. (2005) Fingerprinting the water site in mantle olivine. *Geology* **33**, 869–872.
- Berry, A.J., O'Neill, H.S.C., Hermann, J. and Scott, D.R. (2007) The infrared signature of water associated with trivalent cations in olivine. *Earth Planet. Sci. Lett.* **261**, 134–142.
- Berry, A.J., Walker, A.M., Hermann, J., O'Neill, H.S., Foran, G.J. and Gale, J.D. (2007) Titanium substitution mechanisms in forsterite. *Chem. Geol.* **242**, 176–186.
- Blanchard, M., Ingrin, J., Balan, E., Kovács, I. and Withers, A.C. (2017) Effect of iron and trivalent cations on OH defects in olivine. *Am. Mineral.* **102**, 302–311.
- Carslaw, H.S. and Jaeger, J.C. (1959) Conduction of heat in solids. Clarendon, Oxford, U.K.
- Chen, Y., Provost, A., Schiano, P. and Cluzel, N. (2011) The rate of water loss from olivine-hosted melt inclusions. *Contrib. Miner. Petrol.* **162**, 625–636.
- Demouchy, S. and Mackwell, S. (2003) Water diffusion in synthetic iron-free forsterite. *Phys. Chem. Miner.* **30**, 486–494.
- Demouchy, S. and Mackwell, S. (2006) Mechanisms of hydrogen incorporation and diffusion in iron-bearing olivine. *Phys. Chem. Miner.* **33**, 347–355.
- Demouchy, S. and Bolfan-Casanova, N. (2016) Distribution and transport of hydrogen in the lithospheric mantle: A review. *Lithos* **240**, 402–425.
- Demouchy, S., Jacobsen, S.D., Gaillard, F. and Stern, C.R. (2006) Rapid magma ascent recorded by water diffusion profiles in mantle olivine. *Geology* **34**, 429–432.
- Demouchy, S., Thoraval, C., Bolfan-Casanova, N. and Manthilake, G. (2016) Diffusivity of hydrogen in iron-bearing olivine at 3 GPa. *Physics of the Earth and Planetary Interiors* **260**, 1–13.
- Denis, C.M.M., Demouchy, S. and Shaw, C.S.J. (2013) Evidence of dehydration in peridotites from Eifel Volcanic Field and estimates of the rate of magma ascent. *J. Volcanol. Geoth. Res.* **258**, 85–99.
- Du Frane, W.L. and Tyburczy, J.A. (2012) Deuterium-hydrogen exchange in olivine: Implications for point defects and electrical conductivity. *Geochem. Geophys. Geosyst.* **13**, 1–12.
- Faul, U.H., Cline II, C.J., David, E.C., Berry, A.J. and Jackson, I. (2016) Titanium-hydroxyl defect-controlled rheology of the Earth's upper mantle. *Earth Planet. Sci. Lett.* **452**, 227–237.
- Faul, U.H., Cline II, C.J., Berry, A., Jackson, I. and Garapíc, G. (in revision) Constraints on oxygen fugacity within metal capsules. *Phys. Chem. Miner*.
- Ferguson, D.J., Gonnermann, H.M., Ruprecht, P., Plank, T., Hauri, E.H., Houghton, B.F. and Swanson, D.A. (2016) Magma decompression rates during explosive eruptions of Kīlauea volcano, Hawaii, recorded by melt embayments. *Bull. Volcanol.* **78**, 71.
- Ferriss, E. (2015); pynams: a Python package for interpreting FTIR spectra of nominally anhydrous minerals (NAMs), v0.1.0; DOI: 10.5281/zenodo.32056
- Ferriss, E., Plank, T., Walker, D. and Nettles, M. (2015) The whole-block approach to measuring hydrogen diffusivity in nominally anhydrous minerals. *Am. Mineral.* **100**, 837–851.

- Ferriss, E., Plank, T. and Walker, D. (2016) Site-specific hydrogen diffusion rates during clinopyroxene dehydration. *Contrib. Miner. Petrol.* **171**, 1–24.
- Gaetani, G.A., O'Leary, J.A., Shimizu, N., Bucholz, C.E. and Newville, M. (2012) Rapid reequilibration of H₂O and oxygen fugacity in olivine-hosted melt inclusions. *Geology* **40**, 915–918.
- Gaetani, G.A., O'Leary, J.A., Koga, K.T., Hauri, E.H., Rose-Koga, E.F. and Monteleone, B.D. (2014) Hydration of mantle olivine under variable water and oxygen fugacity conditions. *Contrib. Miner. Petrol.* **167**, 965.
- Hauri, E. (2002) SIMS analysis of volatiles in silicate glasses, 2: isotopes and abundances in Hawaiian melt inclusions. *Chem. Geol.* **183**, 115–141.
- Helz, R.T., Cottrell, E., Brounce, M.N. and Kelley, K.A. (2017) Olivine-melt relationships and syneruptive redox variations in the 1959 eruption of Kīlauea Volcano as revealed by XANES. *J. Volcanol. Geoth. Res.* **333–334**, 1–14.
- Hilchie, L., Fedortchouk, Y., Matveev, S. and Kopylova, M.G. (2014) The origin of high hydrogen content in kimberlitic olivine: Evidence from hydroxyl zonation in olivine from kimberlites and mantle xenoliths. *Lithos* **202–203**, 429–441.
- Ingrin, J., Liu, J., Depecker, C., Kohn, S.C., Balan, E. and Grant, K.J. (2013) Low-temperature evolution of OH bands in synthetic forsterite, implication for the nature of H defects at high pressure. *Phys. Chem. Miner.* **40**, 499–510.
- Jollands, M.C., Padrón-Navarta, J.A., Hermann, J. and O'Neill, H.S.C. (2016) Hydrogen diffusion in Tidoped forsterite and the preservation of metastable point defects. *Am. Mineral.* **101**, 1560–1570.
- Keppler, H. and Smyth, J.R. (2006) *Water in nominally anhydrous minerals, Reviews in mineralogy and geochemistry*. Mineralogical Society of America.
- Kohlstedt, D.L. and Mackwell, S.J. (1998) Diffusion of hydrogen and intrinsic point defects in olivine. *Z. Phys. Chem.* **207**, 147–162.
- Kurosawa, M., Yurimoto, H. and Sueno, S. (1997) Patterns in the hydrogen and trace element compositions of mantle olivines. *Physics and Chemistry of Glasses* **24**, 385–395.
- Le Voyer, M., Asimow, P.D., Mosenfelder, J.L., Guan, Y., Wallace, P.J., Schiano, P., Stolper, E.M. and Eiler, J.M. (2014) Zonation of H₂O and F Concentrations around Melt Inclusions in Olivines. *J. Petrol.* **55**, 685–707.
- Libowitzky, E. and Rossman, G.R. (1996) Principles of quantitative absorbance measurements in anisotropic crystals. *Phys. Chem. Miner.* **23**, 319–327.
- Lloyd, A.S., Plank, T., Ruprecht, P., Hauri, E.H. and Rose, W. (2013) Volatile loss from melt inclusions in pyroclasts of differing sizes. *Contrib. Miner. Petrol.* **165**, 129–153.
- Lloyd, A.S., Ruprecht, P., Hauri, E.H., Rose, W., Gonnermann, H.M. and Plank, T. (2014) NanoSIMS results from olivine-hosted melt embayments: Magma ascent rate during explosive basaltic eruptions. *J. Volcanol. Geotherm. Res.* **283**, 1–18.
- Mackwell, S.J. and Kohlstedt, D.L. (1990) Diffusion of hydrogen in olivine implications for water in the mantle. *J. Geophys. Res. Solid Earth* **95**, 5079–5088.
- Mironov, N., Portnyagin, M., Botcharnikov, R., Gurenko, A., Hoernle, K. and Holtz, F. (2015) Quantification of the CO₂ budget and H₂O–CO₂ systematics in subduction-zone magmas through the experimental hydration of melt inclusions in olivine at high H2O pressure. *Earth Planet. Sci. Lett.* **425**, 1–11.
- Momma, K. and Izumi, F. (2011) Vesta 3 for three-dimensional visualization of crystal, volumetric and morphology data. *J. Appl. Crystallogr.* **44**, 1272-1276.
- Mosenfelder, J.L., Deligne, N.I., Asimow, P.D. and Rossman, G.R. (2006) Hydrogen incorporation in olivine from 2–12 GPa. *Am. Mineral.* **91**, 285–294.
- Mosenfelder, J.L., Le Voyer, M., Rossman, G.R., Guan, Y.B., Bell, D.R., Asimow, P.D. and Eiler, J.M. (2011) Analysis of hydrogen in olivine by SIMS: Evaluation of standards and protocol. *Am. Mineral.* 96, 1725–1741.

- Novella, D., Jacobsen, B., Weber, P.K., Tyburczy, J.A., Ryerson, F.J. and Du Frane, W.L.D. (2017) Hydrogen self-diffusion in single crystal olivine and electrical conductivity of the Earth's mantle. *Scientific Reports* **7**, 5344.
- Padrón-Navarta, J.A., Hermann, J. and O'Neill, H.S.C. (2014) Site-specific hydrogen diffusion rates in forsterite. *Earth Planet. Sci. Lett.* **392**, 100–112.
- Peslier, A.H. and Luhr, J.F. (2006) Hydrogen loss from olivines in mantle xenoliths from Simcoe (USA) and Mexico: Mafic alkalic magma ascent rates and water budget of the sub-continental lithosphere. *Earth Planet. Sci. Lett.* **242**, 302–319.
- Peslier, A.H., Woodland, A.B. and Wolff, J.A. (2008) Fast kimberlite ascent rates estimated from hydrogen diffusion profiles in xenolithic mantle olivines from southern Africa. *Geochim. Cosmochim. Acta* **72**, 2711–2722.
- Peslier, A.H., Bizimis, M. and Matney, M. (2015) Water disequilibrium in olivines from Hawaiian peridotites: Recent metasomatism, H diffusion and magma ascent rates. *Geochim. Cosmochim. Acta* **154**, 98–117.
- Portnyagin, M., Almeev, R., Matveev, S. and Holtz, F. (2008) Experimental evidence for rapid water exchange between melt inclusions in olivine and host magma. *Earth Planet. Sci. Lett.* **272**, 541–552.
- Ruprecht, P. and Plank, T. (2013) Feeding andesitic eruptions with a high-speed connection from the mantle. *Nature* **500**, 68–72.
- Shea, T., Costa, F., Krimer, D. and Hammer, J.E. (2015) Accuracy of timescales retrieved from diffusion modeling in olivine: A 3D perspective. *Am. Mineral.* **100**, 2026–2042.
- Shuai, K. and Yang, X. (2017) Quantitative analysis of H-species in anisotropic minerals by polarized infrared spectroscopy along three orthogonal directions. *Contrib. Miner. Petrol.* **172**, 14.
- Stalder, R., Purwin, H. and Skogby, H. (2007) Influence of Fe on hydrogen diffusivity in orthopyroxene. *European J. Mineral.* 19, 899–903.
- Thoraval, C. and Demouchy, S. (2014) Numerical models of ionic diffusion in one and three dimensions: application to dehydration of mantle olivine. *Phys. Chem. Miner.* **41**, 709–723.
- Tollan, P.M.E., O'Neill, H.S.C., Hermann, J., Benedictus, A. and Arculus, R.J. (2015) Frozen melt-rock reaction in a peridotite xenolith from sub-arc mantle recorded by diffusion of trace elements and water in olivine. *Earth Planet. Sci. Lett.* **422**, 169–181.
- Tollan, P.M.E., Smith, R., O'Neill, H.S.C. and Hermann, J. (2017) The responses of the four main substitution mechanisms of H in olivine to H 2 O activity at 1050 °C and 3 GPa. *Progress in Earth and Planetary Science* 4, 14.
- Walker, A.M., Hermann, J., Berry, A.J. and O'Neill, H.S. (2007) Three water sites in upper mantle olivine and the role of titanium in the water weakening mechanism. *J. Geophys. Res. Solid Earth* **112**.
- Witham, F., Blundy, J., Kohn, S.C., Lesne, P., Dixon, J., Churakov, S.V. and Botcharnikov, R. (2012) SolEx: A model for mixed COHSCl-volatile solubilities and exsolved gas compositions in basalt. *Computers & Geosciences* **45**, 87–97.
- Withers, A.C. (2013) The Pitzer and Sterner Equation of State for Water [WWW Document]. URL http://www.geo.umn.edu/people/researchers/withe012/fugacity.htm (accessed 8.6.13).
- Woods, S.C., Mackwell, S. and Dyar, D. (2000) Hydrogen in diopside: Diffusion profiles. *Am. Miner.* **85**, 480–487.
- Withers, A.C., Bureau, H., Raepsaet, C. and Hirschmann, M.M. (2012) Calibration of infrared spectroscopy by elastic recoil detection analysis of H in synthetic olivine. *Chem. Geol.* **334**, 92–98.
- Zhao, Y.-H., Ginsberg, S.B. and Kohlstedt, D.L. (2004) Solubility of hydrogen in olivine: dependence on temperature and iron content. *Contrib. Miner. Petrol.* **147**, 155–161.