December 22, 2017

Marc Norman

*The Australian National University*

*Canberra, ACT, Australia*

Dear Dr. Norman,

Enclosed please find a manuscript entitled “Site-specific dehydration of olivines from San Carlos and Kilauea Iki” that we submit for consideration for publication in *Geochimica et Cosmochimica Acta.* This manuscript provides new experimental measurements for hydrogen diffusivity in olivine, a fundamental physical parameter that is central to interpreting concentration profiles of hydrogen, or “water”, measured in phenocrysts, olivine-hosted melt inclusions, and mantle xenoliths. The results provide, for the first time, a set of diffusivities for water loss that are common for olivines of composition ~Fo90. These new diffusivities will allow the interpretation of water diffusion profiles in olivine from both phenocrysts and xenoliths to provide estimates of the magma ascent times for explosive volcanic eruptions that take place on minute-to-hour timescales.

Parts of this paper were previously presented at American Geophysical Union Conferences in 2016 and 2017*.*

The corresponding author for this paper is Elizabeth Ferriss, who until recently was an associate research scientist at the Lamont-Doherty Earth Observatory (LDEO) of Columbia University, where this work was performed. Her current contact information is as follows:

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Sincerely,

Elizabeth Ferriss