

August 2, 2015

Dear editor,

Please find attached a manuscript describing our recent work on high pressure hydrous melts, which we hope you will consider for publication as an *Article* in *Geochimica et Cosmochimica Acta*. Our study is entitled *Hydrous melting and partitioning in and above the mantle transition zone: insights from water-rich MgO-SiO₂-H₂O experiments*, with three authors:

- Dr Robert Myhill, corresponding author)
- Prof. Daniel Frost, also from the Bayerisches Geoinstitut
- Dr Davide Novella, Laboratoire Magmas et Volcans, Université Blaise Pascal

Our manuscript describes the first ultrahigh pressure experiments on MgO-SiO₂-H₂O compositions more water-rich than the brucite-quartz binary. We accomplish this by using a new water source, dihydrogen hexahydroxyplatinate, which breaks down to PtO₂ and H₂O at high temperatures. Our compositions help us to explore regions of the ternary system which have been traditionally difficult to reach. These regions include the melt compositions expected within the Earth's interior, and so help us to constrain melt productivity within subducting slabs and around the mantle transition zone.

In addition to constraining the liquidus in water-rich systems, we build a simple melt model for the forsterite-water binary that allows us to model H₂O activities. Using this data, we construct thermodynamic models for water incorporation into the olivine polymorphs at high pressure.

We confirm that the accompanying manuscript is original work, not published elsewhere or under consideration for publication elsewhere. We have no financial conflicts.

Best wishes,

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