

Accepted Manuscript

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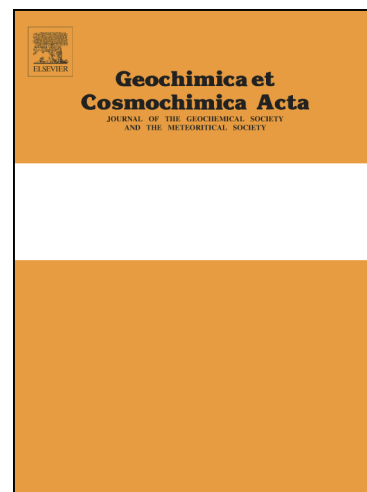
PII: S0016-7037(17)30208-9
DOI: <http://dx.doi.org/10.1016/j.gca.2017.04.004>
Reference: GCA 10229

To appear in: *Geochimica et Cosmochimica Acta*

Received Date: 5 October 2016
Revised Date: 30 March 2017
Accepted Date: 3 April 2017

Please cite this article as: Malaspina, N., Langenhorst, F., Tumiati, S., Campione, M., Frezzotti, M.L., Poli, S., The redox budget of crust-derived fluid phases at the slab-mantle interface, *Geochimica et Cosmochimica Acta* (2017), doi: <http://dx.doi.org/10.1016/j.gca.2017.04.004>

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The redox budget of crust-derived fluid phases at the slab-mantle interface

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Abstract

The redox processes taking place in the portion of the mantle on top of the subducting slab are poorly investigated and the redox potential of crust-derived fluid phases is still poorly constrained. A case study of supra-subduction mantle affected by metasomatism from crust-derived fluid phases is represented by garnet orthopyroxenites from the Maowu Ultramafic Complex (China) deriving from harzburgite precursors metasomatised at ~4 GPa, 750-800 °C by a silica- and incompatible trace element- rich fluid phase. This metasomatism produced poikilitic orthopyroxene and inclusion-rich garnet porphyroblasts. Solid multiphase primary micro-inclusions in garnet display negative crystal shapes and infilling minerals (\pm orthopyroxene, amphiboles, chlorite, \pm talc, \pm mica) occur with constant modal proportions, indicating that they derive from trapped solute-rich aqueous fluids. FT-IR hyper spectral imaging analyses and F06D Raman spectroscopy, together with X-Ray microtomography performed on single inclusions indicate that liquid water is still preserved at least in some inclusions (\pm spinel).

To investigate the redox budget of these fluid phases, we measured for the first time the Fe³⁺ concentration of the micron-sized precipitates of the multiphase inclusions using EELS on a

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