

## Effect of Fe on the nature of OH-defects in olivine

J. INGRIN<sup>1</sup>, M. BLANCHARD<sup>2</sup>, E. BALAN<sup>2</sup> AND I. KOVACS<sup>3</sup>

<sup>1</sup>UMR CNRS 8207, Univ. Lille 1, 59655 Villeneuve d'Ascq, France. jannick.ingrin@univ-lille1.fr

<sup>2</sup>IMPMC, Sorbonne Universités - UPMC Univ Paris 06, UMR CNRS 7590, MNHN, IRD UMR 206, 4 Place Jussieu, 75005 Paris, France. marc.blanchard@impmc.upmc.fr, etienne.balan@impmc.jussieu.fr

<sup>3</sup>Geological and Geophysical Institute of Hungary, Stefánia út 14, 1143, Budapest, Hungary. kovacs.istvan.janos@mfgi.hu

OH-defects involved in the storage of hydrogen in mantle olivine remain poorly identified. This greatly impairs our ability to quantify the water content of the Earth's upper mantle. Significant progresses have been achieved in the identification of OH-defects through the study of the Mg end-member forsterite [1-3]. However, it is not the case for olivine for which, the assignment of several key OH FTIR bands remains unclear. We report here the results of a detailed infrared study of these OH bands in natural olivines, between -194°C and 50°C, and results from a numerical simulation of OH spectra in Fe-doped forsterite. We focused on OH bands in three frequency domains: around 3200 cm<sup>-1</sup>, between 3300-3400 cm<sup>-1</sup> and at 3600 cm<sup>-1</sup>. We highlight the respective role of Fe<sup>3+</sup> and Fe<sup>2+</sup> on the frequency and occurrence of these bands and discuss the implications for the storage of water in olivines of the lithospheric mantle.

[1] Balan et al. (2011) *Eur J Mineral* DOI: 10.1127/0935-1221/2011/0023-2090. [2] Umemoto et al. (2011) *Amer. Min.* DOI: 10.2138/am.2011.3720. [3] Ingrin et al. (2013) *Phys Chem Mineral* DOI: 10.1007/s00269-013-0587-3.