Investigation of fluids in mantle peridotites from Oasis Jetty (east Antarctica) by Raman spectroscopy

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Mantle xenoliths transported to the surface by alkaline mafic and ultramafic rocks are important source of information about processes in the Earth interior. In most cases CO_2 is the dominated constituent of fluid inclusions in xenoliths (Berkesi et.al., 2012; Bergman S.C., Dubessy, 1984). However, cryometric measurements of phase transitions often reveal deviations from monophase fluids, indicating presence of additional components. We report results of investigation of partially decripitated primary fluid inclusions from garnet-spinel xenoliths of east Antarctica (Oasis Jetty) using Raman micro spectroscopy and thermobarometry.

According to the Raman data the fluid has complex composition. Peaks at 2610, 2329, 1388 and 1282 cm^{-1} indicates presence of pressurised CO_2, N_2, H_2S. Molar fractions of the components estimated from integral areas of corresponding peaks are: $CO_2/N_2/H_2S$ = 0.7/0.2/0.1. Similar ratio were identified by cryometry. Crystallization of gas-hydrates in the inclusions suggests also presence of H_2O.

Primary fluid pressure is estimated based on the position of the CO_2 line. Calculated PT-parameters of the mantle peridotites formation is 1270-1280^{0}C and ~2.2GPA.

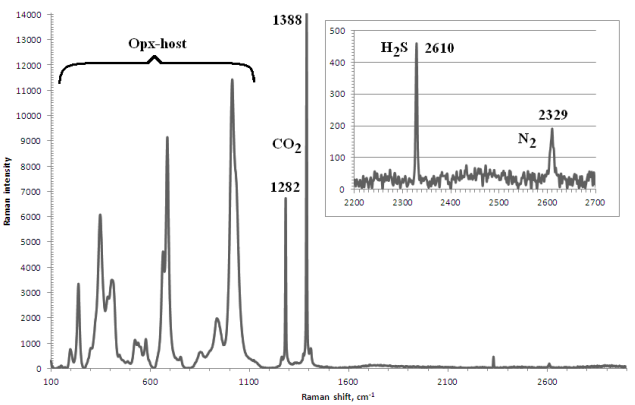

Fig.1 Raman spectra of fluid.