# Spectroscopic estimation of the Moho depth from residual pressures of CO2 fluid inclusions

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Yamamoto et al. (2002) applied micro Raman spectroscopy to the determination of residual pressures of CO2 fluid inclusions of minerals in mantle-derived xenoliths and demonstrated that the mantle xenolith of the Far Eastern Russia originated from the depth up to 40 km corresponding to the uppermost mantle. In this study, we applied this method to ultramafic-mafic xenoliths of Oki-Dogo island in the Japan Sea. The eruption age was reported to be ranging 0.29-0.79Ma (Uto et al., 1994).

The analyzed samples are CO2 fluid inclusions in granulite, lherzolite and olivine gabbro. Granulite and olivine gabrro originated from the lower crust while lherzolite from upper mantle. Comparing the depth origins among these samples can give rise to the determination of the boundary between crust and mantle. Raman spectra of CO2 fluid inclusions of a few micrometers in size were obtained and splitting of the Fermi diad was estimated for the purpose of obtaining density (pressure) of the CO2 fluid inclusions. Taking into account of the equilibrium temperature determined from chemical compositions of pyroxenes, the depths where fluid inclusions were equilibriated with host minerals can be obtained. The depth for gabbro was in the range of 30-34 km and that for lherzolite was 28-32 km. The boundary between these two rocks corresponds to the Moho discontinuity; the present results demonstrate that the Moho discontinuity under Oki-Dogo island was 29-32 km.

The Moho depth can also be estimated by using seismological methods. However, there is no seismic station available and the seismicity is very low in the Japan Sea off Chugoku District. Hence at present we cannot determine the Moho depth right under Oki-Dogo with a seismic method.