

Development of high-precision geobarometer

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Fluid inclusions in mantle-derived minerals can serve as a messenger from deep Earth. If CO₂ is a dominant phase of the fluid, the relationship between intensity ratio and frequency separation of the Fermi diad bands in the Raman spectra of CO₂ can be used for determination of density of the inclusions.

In this study, we installed new Raman spectrometer that was improved spectral resolution. And we also measured its precision of frequency separation (Δ). As a result of this study, we determined that the error of Δ is $\pm 0.003 \text{ cm}^{-1}$ (1σ). Converted into the error of density, this value is $\pm 0.0025 \text{ g / cm}^{-3}$.

Keywords: fluid inclusion, carbon dioxide, Raman spectroscopy, mantle xenolith, geobarometer