

## Incorporation of OH into coesite during quartz-coesite transition

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Coesite is a high-pressure polymorph of silica minerals. Coesite is naturally found in ultra high pressure metamorphic rocks. Hydroxyls can be experimentally incorporated into coesite structure. It suggests that coesite is a possible high pressure phase which can carry hydroxyls to the depth of the upper mantle. Quartz, low pressure phase of coesite, can keep 'water' as hydroxyls and fluid inclusions. In this study, the behavior of 'water' in fluid inclusions in quartz during quartz-coesite phase transition was observed by infrared (IR) microspectroscopy under high pressure and high temperature. Externally heating diamond anvil cell (DAC) was used for in-situ measurements of IR absorption spectra under high temperature and high pressure. IR absorption spectra were measured under IR microscope for IR synchrotron radiation of BL43IR at SPring-8. Quartz thin section of high water contents was prepared for starting material. After HTHP experiments, recovered samples were examined by X-ray diffraction method with Gandolfi camera. Two examples (#1 up to 7GPa, 300C, #2 20GPa, 530C) are shown in this study. #1 sample was identified for quartz and coesite by Gandolfi camera. #2 sample was amorphous states. By compressing samples under room temperature, a broad peak at 3400cm<sup>-1</sup> due to water in inclusion shifts to the lower wavenumber region (~3200cm<sup>-1</sup>). It suggests solidification of H<sub>2</sub>O. By heating sample #1 under compression, the broad peak of #1 shifts to the higher wavenumber region and became a sharp peak at 3500cm<sup>-1</sup>. The peak at 3500cm<sup>-1</sup> is consistent with an OH peak in coesite which is reported by Koch-Muller et al. 2001. Therefore, this suggests OH defects can be formed in coesite during quartz-coesite transition. #2 sample which undergoes the stable region of stishovite did not transform to stishovite, but amorphous states.