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SMP48-P04 Room:Convention Hall Time:May 23 17:15-18:45

# Stabilities of filled ice II structure of hydrogen and helium hydrates at low temperatures and high pressures

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High pressure and low temperature experiments with filled ice II structures of hydrogen hydrate and helium hydrate were performed by using diamond anvil cells and a helium-refrigerator cryostat. The experimental conditions were in a region of 0.2 to 4.5 GPa and 130 to 300 K for the former hydrate and of 0.2 to 5.0 GPa and 200 to 300 K for the latter one, respectively. X-ray diffractometry for hydrogen hydrates revealed a series of phase change from sII to filled ice Ic via filled ice II. Change in a/c ratio was observed at approximately 2 GPa, and Raman spectroscopy also showed changes in frequencies of vibron and OH vibration mode at around 2 GPa within the filled ice II structure. For helium hydrate, X-ray diffractometry showed that the filled ice II structure did not transformed to filled ice Ic structure in this study, being contrary to the previous prediction, but decomposed into helium and ice VI or VIII. Difference in compressibility between both hydrates was examined in relation to their stabilities.

Keywords: hydrigen hydrate, helium hydrate, filled ice II structure, stability