

## Cross section observation of shallow gas hydrates by Raman imaging

TANI, Atsushi<sup>1\*</sup> ; KURUMI, Keisuke<sup>1</sup> ; HIRUTA, Akihiro<sup>2</sup> ; MATSUMOTO, Ryo<sup>2</sup>

<sup>1</sup>Osaka Univ., Sci., <sup>2</sup>Meiji Univ. GHLAB

Natural gas hydrate, an inclusion compound of natural gas in water cages, is found in deep-sea sediments and permafrost region. In eastern margin of Japan Sea, shallow gas hydrates have been found and recovered by piston coring (Matsumoto et al., 2011; Lu et al., 2011). X-CT observation of the shallow gas hydrates revealed that icy materials divided into two regions (darker and lighter regions) by CT-values (Tani et al., 2013). Since CT-values of ice and natural gas hydrate are close each other due to similar X-ray linear attenuation coefficients, it is difficult to specify which region is gas hydrate only by CT images. In this study, cross section of the shallow gas hydrate was observed by Raman imaging to understand the differences of the darker and lighter regions in CT-values. The sample recovered from the eastern margin of Japan Sea in UT13 cruise was measured by X-CT first and then broken into two pieces. The cross section was measured by Raman imaging. The results indicate that pieces of natural gas hydrate with a few mm in diameter are scattered in the sample. Comparison between Raman images and CT images reveals that the lighter region of icy materials in CT images is natural gas hydrate and the darker region is ice. This study was supported by 2014 development and promotion program of methane hydrate.

Keywords: shallow gas hydrates, imaging, Raman, X-CT, dissociation