MICRO-SIZED GAS HYDRATE FROM MICRO BUBBLES AIMED AT GAS HYDRATE FORMATION IN SATURATED SAND

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ABSTRACT
Micro-sized gas hydrate has been formed successfully from micro bubbles using a modified rotary homogenizer. The particle distribution of micro-sized Xenon hydrate formed at atmospheric pressure shows the peak diameter at around 10μm for 1.5wt% THF solution. Moreover, by means of operating in a water-filled pressure vessel, methane micro bubbles can be generated at high pressure by the modified homogenizer and micro-sized methane hydrate has been captured by an optical microscope implying the existence of micro methane hydrate in methane charged water which may raise the methane concentration.

Keywords: gas hydrates, micro bubbles, dissolved water, rotary homogenizer

INTRODUCTION
Sand and mud alternation settings peculiar to turbidite layer are prospective methane hydrate reservoir in eastern Nankai Trough in Japan. Since pore saturation of methane hydrate is rather predominant in sandy marine sediments, mimic methane hydrate-bearing sediments (hereafter abbreviated as MHBS) have been made employing Toyoura sand to investigate mechanical properties, for example, in our laboratory. In the preparation, methane hydrate can be formed synthetically from gaseous methane confined in pore space of an unsaturated host specimen, and then methane remaining in the pore space is purged by water injection to the hydrate-formed specimen. In this case, morphology of methane hydrate growth at grain-to-grain contacts is constrained by meniscus and pore water distribution depending on the capillary action in the unsaturated host specimen. In another way of methane hydrate formation, methane charged water is otherwise used to make mimic MHBS in water saturation, and this technique has not been employed in our experiment. Spangenberg et al. [1] carried out methane hydrate formation in pore space of spherical glass beads with the porosity of 38% and raised the pore saturation to 95% in the period of about 50 days. By adding a source chamber to their system, Waite et al. [2] proposed a technique to increase methane content in methane charged water passing through granular methane hydrate formed in the source chamber. Their concept is focused on mixing hydrate micro-crystals with methane charged water. In this study, an enhanced

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