

## Experimental study on the phase equilibrium condition of CO<sub>2</sub> hydrate with marine sediment

\*Daisuke Maki<sup>1</sup>, Hitoshi Tomaru<sup>1</sup>

1. Graduate School of Science and Engineering, Chiba University

Gas hydrate accumulation has been found in the marine sediments around Japan, and has been regarded as an unconventional gas resource because it contains a huge amount of methane. The phase equilibrium condition of gas hydrate provides a key parameter to estimate the distribution and resource potential of gas hydrate. Although the influences of temperature, pressure, gas/water composition, etc. on the phase equilibrium have been studied so far, experimental studies concerning the effect of sediment particles in shallow gas hydrate deposit are not well understood. In this study, we synthesized carbon dioxide hydrate which has similar physicochemical behavior to methane hydrate and examined the phase equilibrium condition with the mud collected near the shallow gas hydrate in the Japan Sea. It was found that the equilibrium condition with mud was significantly reduced; about 0.2°C lower and about 0.1 MPa higher compare to mud-free environment. Our results strongly indicates that the existence of mud may change the stability condition of gas hydrate in the natural environment and it is necessary to consider this effect for estimating gas hydrate distribution and stability fields.

Keywords: gas hydrate, phase equilibrium