LAB-SCALE THERMAL STIMULATION ON NATURAL GAS HYDRATE-BEARING SEDIMENTS SUB-SAMPLBED FROM PRESSURE CORES-PRELIMINARY RESULTS

Joo Yong Lee*, Jaehyng Lee, Jae Woong Jung
Korea Institute of Geoscience and Mineral Resources (KIGAM)
92 Gwangah-no, Yuseong-gu, Daejeon 305-350, KOREA

ABSTRACT
Natural gas hydrate-bearing sediments recovered using pressure corer from the Ulleung Basin, East Sea in 2007 and stored in pressure storage chamber, are used for lab-scale test production using depressurization method. The water depths at coring sites range from 1800m ~ 2100m and the tested cores have been obtained from 138mbsf. The pressure core sample has been stored in pressure storage chamber onboard and cut and transferred to GHOBS II under in-situ fluid pressure condition for post-cruise production tests. An experimental device (GHOBS II – Gas Hydrate Ocean Bottom Simulator II) that can accommodate pressure core samples sub-sampled from pressure cores under pressure is designed and used in this study. GHOBS II has the capability of multi-sensor monitoring and applying 20 MPa of fluid pressure and 5MPa of vertical effective stress, which are within the typical ranges of stress condition in deep sea ocean bottom. Thermal stimulation method has been applied for the lab-scale test production. This is the first thermal stimulation production test under vertical effective stress with natural gas hydrate-bearing sediments that never have experienced depressurization from in-situ status. Preliminary results on the evolution of the production behaviours and some physical properties are introduced in this manuscript. These preliminary results introduce the behaviours of GH-bearing muddy sediments during thermal stimulation production.

Keywords: gas hydrates, thermal stimulation, pressure core

INTRODUCTION
Gas production from gas hydrate deposits requires different knowledge and technologies from conventional gas production since it involves the dissociation of solid gas hydrate into fluid phases. Major gas production methods from gas hydrates includes depressurization, thermal stimulation, chemical injection, gas swapping method, and the combination of these. Geotechnical properties of hydrate-bearing sediments, such as compressibility and permeability, are key factors in assessing safe and efficient gas production from gas hydrate-bearing deposits. Lab-scale experimental studies on these issues using synthetic hydrate-bearing sediments have revealed many secrets about the geotechnical behaviors during gas hydrate production [1, 2, 3, 4]. To obtain the field applicability of these results, experimental study using natural sample acquired from in-situ is desired. In this study, both production and geotechnical behaviors are monitored during thermal stimulation production experiment using natural gas hydrate-bearing sediments retrieved with pressure corers.

* Corresponding author: Phone: +82 428683219 Fax +82 428683417 E-mail: jyl@kigam.re.kr