

## Methane hydrate formation in clay-rich part of natural gas hydrate layer

고동연<sup>1,2</sup>, 서영주<sup>3</sup>, 설지용<sup>1</sup>, 연순화<sup>1</sup>, 이 혼<sup>1,\*</sup>  
<sup>1</sup>한국과학기술원; <sup>2</sup>에너지 및 환경시스템 연구실;  
<sup>3</sup>LG화학 기술연구원  
(h\_lee@kaist.ac.kr\*)

2:1 smectite clay minerals are widespread in world wide deep sea sediments and there are many types of 2:1 smectite clays with different chemical compositions and properties. When the hydrate form in the interlayer of the 2:1 clay minerals, the structure of clays stayed unchanged. In this work, we defined various clay characteristics which have effect on clay methane hydrate intercalates. And we have identified the thermodynamic stability effect of those of intercalates from macroscopic levels to microscopic levels. We extend our overall research of methane hydrate intercalates to understand the real existence of methane hydrates at clay-rich part of sediments which is also important in in-situ ocean drilling operation. For the analysis of forming hydrates, we mainly used the solid state <sup>13</sup>C NMR recorded on a Bruker DMX 400 MHz spectrometer and FT-RAMAN spectrometer.