

Crystallographic features of natural gas hydrates recovered by pressure coring in the eastern Nankai Trough area

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Natural gas hydrates are crystalline clathrate compounds that natural gas components are incorporated into cage-like frameworks consist of hydrogen-bonded water molecules. Natural gas hydrates are stable under high pressure and low temperature conditions such as deep marine environments. Crystallographic structures of gas hydrates are related to amount of trapped gas or thermodynamically stable condition for natural gas hydrates, which are important to characterize natural gas hydrate reservoirs.

In this study, the crystallographic properties of the natural gas hydrates recovered by pressure coring in the eastern Nankai Trough area were characterized by the spectroscopic analyses. The hydrate-bearing sediments were recovered from the eastern Nankai Trough area during the 2012 JOGMEC/JAPEX Pressure coring operation, aboard the DV Chikyu.

The primary hydrocarbon component is microbial methane for gases released from the hydrate-bearing sediments. The released gas contained trace amounts of ethane and heavier hydrocarbons. NMR and Raman spectroscopic analyses reveal that the crystallographic structure is structure I and the hydration number is 6.1.

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