

# Experimental investigation and modeling on the dissociation conditions of methane hydrate in clayey silt cores

Changhong Yu<sup>1</sup>, Baojiang Sun<sup>2</sup>, Tangyang Yang<sup>2</sup>, zhiyuan wang<sup>2</sup>, Yonghai Gao<sup>2</sup>, and Litao Chen<sup>2</sup>

<sup>1</sup>China University of Petroleum Huadong

<sup>2</sup>Affiliation not available

December 17, 2021

## Abstract

The dissociation conditions of hydrate in clayey silts are of great significance for its efficient production. In this work, the dissociation conditions of methane hydrate in clayey silt cores were experimentally measured by step-heating method. Various cores including quartz powder, montmorillonite and South China Sea sediments were used for investigation. The results showed that the dissociation temperatures of methane hydrate in clayey silt cores depressed compared to bulk hydrate. In comparison to grain size, salinity and lithology had a more significant influence on the equilibrium temperature depression. A water activity meter was used to measure the water activity in clayey silt cores. The influence of salt and minerals on water activity was investigated. By combining the measured water activity data with the Chen-Guo model, a novel water activity measurement method (WAM) for the hydrate dissociation conditions prediction was proposed. The predicted results are in good agreement with the experimental data.

## Hosted file

Manuscript\_AICHEJ.docx available at <https://authorea.com/users/451641/articles/549859-experimental-investigation-and-modeling-on-the-dissociation-conditions-of-methane-hydrate-in-clayey-silt-cores>