

The Saturation Level of Methane Hydrate in Natural Sediments

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The accurate estimate of the resource of natural gas hydrate is one of the most important issues in assessing the energy potential of natural gas hydrate, which relies largely on the data precision of hydrate saturation level in the sediments of a reservoir.

Occurring in sediment pore has been recognized as the primary occurrence mode of gas hydrate in the Eastern Nankai trough area. It was suggested that the distribution of coarse-grained sands is one of the most important factors controlling the occurrence of natural gas hydrates. This research aimed at elucidating the particle size and clay mineral effects on hydrate saturation in sediments through an experiment approach.

The specimens, including sand, silty sand, silt, representing of the main sediment types recovered from the gas hydrate distribution region of the Eastern Nankai Trough, were tested. The obtained results from the experiments clearly indicate a particle size and clay content dependent trend, being low in saturation in fine sediment but high in coarse sediment.

For a better understanding of the mechanism of these two factors, studies have been carried out to investigate the saturation level of methane hydrate in a series of silica powders and clay. The results obtained indicate that particle size and clay contents are the two key factors determining the saturation level of gas hydrate in sediments: the finer the particle size and/or the higher the clay content, the lower the hydrate saturation. It has been found that fundamentally the effect of particle size or clay mineral on hydrate saturation level can be accredited to specific surface area of sediment.

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