

## **Effect of a Solid Matrix and Different Salts on the Formation of Clathrate Hydrates of a Natural Gas**

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In order to measure the effect of the presence of a sample of solid matrix from an oil well on the transition temperature of clathrate hydrates of a natural gas, several experimental determinations were carried out. The pressure-temperature (PT) curves for the formation-dissociation (three-phase transition) of a natural gas in distilled water, a natural gas in sea water, and a natural gas in distilled water with the presence of known amounts of a solid matrix were obtained. It is observed that the experimental equilibrium PT curve of the studied natural gas in distilled water with a known amount of the solid matrix and that of the same natural gas in synthetic seawater are displaced to the left of the equilibrium curve of the same natural gas in distilled water. These results clearly indicate that both the solid matrix and the salts have an inhibitor effect on the formation of natural gas hydrates. The temperature of the natural gas hydrate dissociation in sea water respect to the transition temperature in distilled water shows a depression between (1.7 and 2.5) K for the pressure range (0.81 to 8.59) MPa, whereas the temperature of the hydrate dissociation in distilled water containing the solid matrix with respect to that in distilled water shows a depression between (1.0 and 2.1) K for the pressure range (0.78 to 3.15) MPa. These results should be of great interest for the safe exploitation of oil reservoirs in deep water. All the experimental PT results for each of the studied systems were correlated with the Clausius-Clapeyron equation.