



Investigating and Modeling the Thermo-Dynamic Impact of Sodium Chloride and Sodium Sulfate on Prevention of the Formation of Methane Hydrate

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Abstract

Devising methods to prevent hydrate formation is of the important issues in natural gas industry. Since a great deal of money is annually spent on using hydrate inhibitors, identification of new inhibitors with higher degrees of efficacy is economically justifiable. The present article attempts to investigate two compounds of NaCl and Na₂SO₄ as inhibitors of methane hydrate's formation so as to respond to "what is the inhibitive thermo-dynamic impact of electrolyte compounds of NaCl and Na₂SO₄ on the formation of methane hydrate?". To do so, this study not only measures the equilibrium temperature and pressure of methane hydrate formation in the presence of electrolyte solutions of NaCl and Na₂SO₄ and compares the results obtained with the state lacking such inhibitors, but it also assesses the regression and mathematical modeling are utilized within a basic virtual environment in order to propose a model for prediction of thermo-dynamic equilibrium temperature and pressure of methane hydrate formation.

Keywords : Electrolyte Solutions, Methane Hydrate, Sodium Chloride, Sodium Sulfate, Thermodynamic inhibitor.

Research Highlights

- Both electrolytes NaCl and Na₂SO₄ reveal an inhibitive impact on hydrate formation.
- Sodium chloride exerts a greater influence than sodium sulfate.
- A ten-variable linear regressive model was proposed for the thermo-dynamic model of methane hydrate formation in the presence of electrolytes.