Influence of Oil Extracts and Refined Petroleum Products on the Decomposition Process of Methane Hydrate

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Study of gas hydrates in an oil at temperature below 0 °C showed that a self-preservation effect occurs in this temperature range. This specific behavior of gas hydrates in an oil is in essence a new and important feature of such systems from a practical point of view. Thus, the hydrates can exist in oil content systems for a long time in the p-T region, where they are thermodynamically unstable.

The peculiarity of this study is to control gas hydrate decomposition by modification of the hydrate surface with additives. It is well known that some of the natural oil components influence the formation and growth of hydrate particles. The data on the influence of these components on the decomposition process of a gas hydrate-in-oil suspension are practically absent (especially at temperatures below 0 °C). The aim of this work was to study features of decomposition of methane hydrate modified with some additives not involved in hydrate formation (oil extracts, refined petroleum products). The methane hydrate was doped with additives either directly during sample synthesis or by their deposition on the surface of hydrate particles obtained. Similar studies with pure hydrate particles were also carried out. As a result, it has been found that some refined petroleum products exhibit close to oil efficiency with respect to self-preservation of methane hydrate. On the other hand, a synthetic additive that prevents the self-preservation of methane hydrate placed in the petroleum products has been identified.

Acknowledgments. This work was supported by Russian Science Foundation grant N° 17-77-10051.