

The press service of the Ministry of Education and Science of the Russian Federation reported that the scientists of the Kazan Federal University, together with foreign colleagues, discovered a mechanism that accelerates the formation of gas hydrates using surface-active substances (surfactants). The results of the study can lead to the creation of new technologies for safe storage and transportation of natural gas.

Gas hydrates are crystalline compounds similar to compressed snow. They are formed from water and gas under certain conditions and allow you to store and transport gas without the use of pipelines. Until now, their use has been limited to the slow rate of formation and insufficient gas absorption.

Scientists have conducted a computer modeling of the hydrate formation process with the participation of 13 different surface-active substances. It turned out that the effectiveness of the surfactant is determined not by their ability to form micelles, as previously believed, but by molecular architecture, the distribution of the charge and interaction with water molecules.

It was found that the greatest efficiency is shown by the surfactant with the optimal hydrophilic-hydrophobic balance. They help the water molecules to form ordered structures, which significantly accelerates the growth of hydrate crystals. An important factor is the strength of hydrogen connections – if they are too strong, it, on the contrary, can interfere with the process.