

Influence of silica gel on HFC-134a hydrate formation rate in seawater

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Gas hydrates (or clathrate hydrates) are ice-like crystalline molecular complexes formed when water mix with suitably sized 'guest' gas molecules. The hydrogen bonding in water (host) molecules lead lattice structures with several interstitial cavities to be formed. The guest gas molecules can occupy the lattice cavities. When a minimum number of cavities are filled, the crystalline structure will be stable and it will form solid gas hydrates, even at temperatures well above the melting point of water ice. Porous medium such as silica gel have significant influence on hydrate formation rate, as they can reduce the chemical barrier which hydrate formation must overcome and promote hydrate formation. HFC-134a has been used in this report as the guest gas since it is a refrigerant. In this experiment, three sizes of silica gel were used and for each size, three different weights were conducted. Operation condition for each variables are remained same. This research was a part of the project titled "Development of Key Technology in Seawater Desalination using Gas Hydrate Process" funded by the Ministry of Land, Transport, and Maritime Affairs, Korea.