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**Kinetic promotion of methane hydrate formation by combining anionic and silicone surfactants: scalability promise of methane storage due to prevention of foam formation**

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**Abstract:**

Methane storage in its solid hydrate form has recently come up as a rather attractive and low risk option for large scale storage of the gas owing to its mild storage conditions, high gas retention capacity and benign (non-explosive) character. However, it has its fair share of limitations with the slow rate of hydrate formation being one of the most prominent. The addition of surfactants like Sodium dodecyl sulfate (SDS) to the hydrate forming system significantly speeds up the process of methane hydrate formation but the large amount of foam generated by these surfactants during the process of hydrate formation and dissociation stands as a major roadblock towards the scaling up of the technology. In the current work, a small amount of a silicon based surfactant has been proposed to be used as antifoam in conjunction with an anionic surfactant SDS to eliminate the foam generation while at the same time promote the kinetics of methane hydrate formation. The idea is simple, cost effective and can be a potential game-changer in the quest to develop a commercially scalable hydrate based methane storage technology.

*Keywords: Gas Hydrate, Methane Storage, Silicone Surfactant, Antifoam, Kinetics, Scale-up*

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