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Green and Viable Natural Gas Storage with Hydrate Technology

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Abstract:

Natural gas can be stored in the hydrate structure with much lower energy required than other conventional natural gas storage technologies. Methane hydrate structure can accommodate up to 180 v/v of natural gas. However, the hydrate formation rate is rather slow and moderately low temperature, below 4°C, is needed. To increase the methane hydrate formation rate, we have explored the possibility of using porous materials to increase the contact surface between the gas and liquid, which is believed to govern the hydrate formation. In addition, a number of promoters including both kinetics and thermodynamics promoters has been investigated. Synergistic effects between the porous materials and promoters have also been discovered. Currently, the methane hydrate formation can be achieved close to room temperature with moderate pressure. Furthermore, methane recovery from the hydrates is more than 90%.

References: (if applicable)

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Pramoch Rangsunvigit, born in 1969, is a professor in chemical engineering at The Petroleum and Petrochemical College. He is also the director of the Center of Excellence on Petrochemical and Materials Technology (PETROMAT). His research interest involves separation processes and gas storage including hydrogen and methane with a number of technologies.