

Methane Hydrate Production by Flue Gas in Horizontal and Vertical Column Reactor

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The amount of recovered methane from methane hydrate bearing sediments was investigated by using a continuous stream of a CO₂ and N₂ gas mixture. A long cylindrical high-pressure reactor was designed to demonstrate the recovery of methane from methane hydrate bearing sediments, and the injection rate of the gas mixture was controlled to monitor the amount of recovered methane from methane hydrates. The recovery efficiency of methane gas from methane hydrates is in inverse proportion to the flow rate of the CO₂ and N₂ gas mixture. Methane hydrates were synthesized by using two different sediments, having particle size distributions of 75 to 150 μm and 45 to 90 μm with the same porosity, and the recovery efficiency of methane from methane hydrates was also monitored. We confirmed that there is no significant difference in the replacement characteristics by using these two different sediments. Horizontal and vertical flows of the CO₂ and N₂ gas mixture were applied to monitor the effect of flow direction on replacement characteristics and we also confirmed that a similar amount of methane was recovered in horizontal and vertical flows of the CO₂ and N₂ gas mixture at the same flow rate.