

SF₆ 하이드레이트 결정 성장의 특성

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Morphological study of SF₆ clathrate hydrate crystal

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Abstract : Global warming has been widely recognized as a serious problem threatening the future of human beings. It is caused by the buildup in the atmosphere of greenhouse gases, such as carbon dioxide, methane, hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF₆). Particularly, SF₆ has extremely high global warming potential compare to those of other global warming gases. One option for mitigating this greenhouse gas is the development of an effective process for capturing and separating these gases from anthropogenic sources. In general, gas hydrates can be formed under high pressure and low temperature. However, SF₆ gas is known to form hydrate under relatively milder conditions. Therefore, technological and economical effects could be expected for the separation of SF₆ gas from waste gas mixtures. In this study, we carried out morphological study for the SF₆ hydrate crystals to understand its formation and growth mechanisms. The observations were made in high-pressure optical cell charged with liquid water and SF₆ gas at constant pressure and temperature. Initially SF₆ hydrate formed at the surface between gas and liquid regions, and then subsequent dendrite crystals grew at the wall above the gas/water interface. The visual observations of crystal nucleation, migration, growth and interference were reported. The detailed growth characteristics of SF₆ hydrate crystals were discussed in this study.

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