

Methane Gas Enclathration in Alcohol Hydrates

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Because of huge amounts of energy sources in the form of natural gas hydrates, gas hydrate have received much attention, and many researchers investigated the methods of recovering methane gas from the natural gas hydrates stored on the deep sea ocean or permafrost regions. The one of the effectiveness methods for dissociation of methane hydrate is the injection of inhibitor, and alcohols are the noted thermodynamic hydrate inhibitor. Because of the hydroxyl group in alcohols, the activity of water molecules are depressed due to the hydrogen bond between water and methanol, and it might inhibit the hydrate formation thermodynamically. However, as the number of hydrocarbon groups in alcohols increases, the effects of the hydrogen bonds on water-alcohols interactions decrease, and then the hydrophobic balance become strong. The relationship between hydroxyl group and hydrophobic ends in alcohols therefore cannot be easily described. In this study, we attempt to examine the alcohols hydrate with gaseous methane system through spectroscopic observation such as nuclear magnetic resonance, Raman, and powder x-ray diffraction methods.