

Phase Equilibria for Carbon Dioxide Hydrates in the Presence of Aqueous Solutions of Ethylene Glycol and Methanol

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Conditions for the formation of gas hydrate are required in the field of carbon dioxide sequestration and enhanced oil recovery to prevent the formation of gas hydrate. The formation of gas hydrates cause the blockage of pipelines. Thermodynamic inhibitors such as ethylene glycol and methanol shifts the hydrate containing phase equilibria to lower temperatures and higher pressures. Literature data usually specified temperature, pressure, and mass fraction fraction of aqueous solutions but did not specify the loading fraction of carbon dioxide. In this work, hydrate containing phase equilibria were measured with completely known compositions. Dissociation temperatures of gas hydrates were measured by heating the system while the pressure was maintained by a pressure generator. As the loading fraction of carbon dioxide increases, dissociation temperatures of gas hydrates decreases in the system containing aqueous solutions of methanol. However, the dissociation temperature difference of CO₂-rich system and CO₂-lean system containing aqueous solutions of ethanol is small.