

### Temperature dependence of intrinsic properties of mixed gas hydrates

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The phase behavior and crystal structure (structure I, II, and H) of various gas hydrate systems are strongly dependent on the size of guest molecules. In particular, multi-component hydrate systems including two or three guest species exhibit complicated phase behaviors. Equilibrium composition renders a decisive intensive quantity for describing intrinsic phase behavior of mixed gas hydrates in addition to pressure ( $p$ ) and temperature ( $T$ ). A primary aim of phase equilibrium studies for mixed gas hydrates is to survey hydrate formation and dissociation conditions at each corresponding phase compositions. This provides insight concerning both the crystal structure and the distribution of guest molecules over the several types of cages. Actually, phase diagrams for mixed gas hydrates have relied on the modeling and simulation in a variety of guest components. As a consequence, their predicted results are awaiting experimental confirmation to ensure consistency of calculations. The present study introduces the experimental technique and data for phase equilibrium measurements of gas hydrates under isothermal conditions.