Phase equilibrium and spectroscopic identification of binary (tert-butyl hydroperoxide + gaseous) clathrate hydrates

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Structure-II hydrate has been interested due to its gas storage capacity and mild dissociation points of hydrate structures. In this study, we introduce a new structure-II hydrate former, tert-butyl hydroperoxide, and identify the structure and guest distributions through spectroscopic tools such as High-Resolution Powder Diffraction (HRPD), ^{13}C solide-state NMR and Raman spectroscopy. Here, we also investigated the thermodynamic stability of binary (TBHP + gaseous) clathrate hydrates. The experimental data were generated using the high-pressure equilibrium cell. The dissociation points of binary (TBHP + gaseous) clathrate hydrates are compared with other clathrate hydrates.