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Phase Stability Conditions of Clathrate Hydrates in the (Methane + 3-Methyl-1-Butanol + Water), (Methane + 3,3-Dimethyl-2-Butanone + Water) and (Methane + 2,3-Dimethyl-2-Butene + Water) Systems: Experimental Measurements and Thermodynamic Modeling

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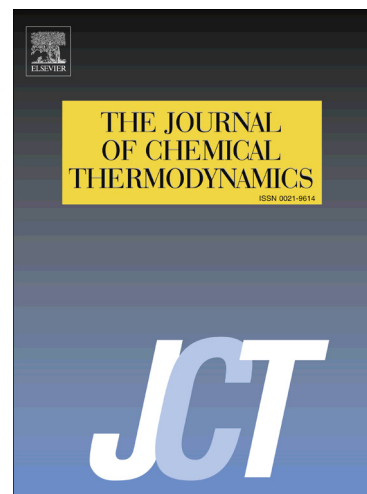
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Abstract - In this communication, hydrate dissociation data for methane + three liquid hydrocarbons namely 3-methyl-1-butanol, 3,3-dimethyl-2-butanone and 2,3-dimethyl-2-butene are reported. An isochoric pressure-search method was employed to generate the four-phase equilibrium data in the diverse pressure ranges (2.4-8.2 MPa, 1.7-7.6 MPa, and 2.8-7.1 MPa), respectively. The corresponding temperature ranges are (274.3-284.3 K, 277.1-288.9 K and 274.4-283.3 K), respectively. The obtained results in comparison with methane hydrate dissociation data indicate that at a given pressure, the dissociation temperature in the system consist of methane + 3-methyl-1-butanol + water roughly equals to those in the system with methane hydrate. Although initial four phase hydrate dissociation data of methane + 2,3-dimethyl-2-butene + water system has not been determined to exhibit promotion effect, the reduction of hydrate dissociation pressure was observed in the methane + 3,3-dimethyl-2-butanone + water system. Furthermore, estimation of hydrate dissociation conditions of the aforementioned systems has been done by applying the van der Waals-Platteeuw type thermodynamic model and a good agreement is observed.

Keywords: Gas Hydrate; Experimental data; 3,3-dimethyl-2-butanone; 3-methyl-1-butanol; 2,3-dimethyl-2-butene; Model.

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