Thermodynamic study of clathrates hydrates from hydrocarbon gas mixtures consequences for CO2 capture and flow assurance

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This work presents details on the experimental procedure to measure the composition of the hydrate that crystallizes from a hydrocarbon gas mixture. We show that the results are time dependent and tend to thermodynamic equilibrium as time tends to infinity. An immediate consequence concerns two major domains of applications, CO₂ capture from power plants, as well as flow assurance in the oil and gas industry. In fact, in both the cases, the crystallization is under non-equilibrium conditions, and we conclude here that it necessarily leads to the formation of hydrates with a composition which is not predicted by classical modeling.