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Introductory overview: Hydrate knowledge development

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ABSTRACT

An overview is provided for the remainder of the volume. After an initial motivation section with hydrate applications, the hydrate structures are exposed, by considering two formation heuristics. Second, the history of hydrate knowledge both within and without the pipeline is outlined, and examples are given of technology transfer between the two arenas. The hydrate experimental physics and chemistry are then presented on three levels: micro-, meso-, and macroscopic. Finally it is suggested that the state-of-the-art of hydrate thermodynamics is satisfactory for most engineering applications, because the prediction accuracy is close to the experimental accuracy. Hydrate kinetics, on the other hand, is presented as a major physico-chemical challenge for the future.