

Natural Gas Clathrate Hydrates (Invited Touloukian Award Plenary Lecture)

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Clathrate hydrates find applications as: 1) the largest energy reserve, 2) the most important factor in deepwater flow assurance, and 3) stranded natural gas storage. This lecture will review thermodynamics of hydrates as one of the most-frequent statistical mechanics applications in industry. Second, a conceptual kinetics model will be presented in microscopic, mesoscopic, and macroscopic dimensions. Third, energy applications of thermodynamics and kinetics will be depicted in the three initially-mentioned domains. Finally, future predictions will be given.