

Decoding Decarbonization through Clathrate Hydrates

Praveen Linga

Department of Chemical and Biomolecular Engineering, College of Design and Engineering, National University of Singapore, Singapore

Abstract:

Climate change is known to be dominantly caused by the increased concentration of greenhouse gases in the atmosphere, in particular carbon dioxide (CO₂). The clathrate hydrate process has been demonstrated over the years as a promising technology for innovative applications like natural gas storage, carbon dioxide capture, seawater desalination, cold energy storage etc. CO₂ hydrate, a solid compound made of molecular CO₂ enclathrated in crystalline lattices formed by water molecules, is an attractive option to capture, intermediary storage and for long-term CO₂ sequestration. Methane (CH₄) hydrates in oceanic sediments have been stable for millions of years. As a natural analog, is it possible to store CO₂ in the form of hydrates in oceanic sediments forever? In this presentation, the state of the art on clathrate hydrate technology pertaining to carbon capture and storage will be discussed in detail and its perceived path decoding decarbonization will be discussed. Furthermore, future research and development opportunities and pathways for commercialization will be discussed.

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