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TITLE: The status of natural gas hydrate research in China: A review

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ABSTRACT:

Over the past century, fossil fuels have provided the majority of China's energy. However, their extensive utilization leads to a shortage and environmental pollution. Recently, submarine and permafrost gas hydrate deposits have been investigated as a possible clean and sustainable energy source by governmental institutions, research organizations, and energy industries in China. The primary objective of this paper is to review the potential studies pertaining to gas hydrate exploration and resource assessment, the safe and efficient exploitation of gas hydrates and the basic properties of gas hydrates. To date, there are over 20 institutions and organizations in China committed to gas hydrate investigation, among which the Guangzhou Marine Geological Survey (GMGS) and the Chinese Academy of Geological Sciences (CAGS) etc. primarily focus on gas hydrate exploration research, while the China National Offshore Oil Corporation (CNOOC) Research Center, Guangzhou Institute of Energy Conversion (GIEC) and China University of Petroleum-Beijing (CUPB) etc. concentrate on gas hydrate mining technologies. In this paper, the occurrence and exploration of gas hydrates in both permafrost regions and the continental slope of China have been determined from numerous research contributions and are presented. Moreover, the latest progress in gas hydrate fundamental studies, including hydrate phase equilibria, hydrate formation mechanisms, hydrate thermal physical properties and the acoustics and resistivity characteristics of gas hydrates are briefly reviewed, and relevant data are gathered and compared. Emphasis is also placed on gas hydrate mining technologies and gas production using depressurization methods, thermal stimulation methods or other methods. Furthermore, the security of natural gas hydrate-bearing sediments during gas production and the environmental impacts of gas hydrate are identified. With additional financial and political support and advanced research facilities, research on gas hydrates in China is progressing rapidly but is still in its early developing stage, thus, future work should be undertaken with greater diligence.

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