

Unveiling the Depths: Exploring Underground Hydrogen Storage for a Sustainable Energy Future

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In this lecture, I will delve into the fascinating world of underground hydrogen storage and explore various aspects that play a crucial role in this process. Join me as we explore the intriguing topics of hydrogen conversion, contamination, microbial activities, geochemical reactions, cushion gas, storage integrity, characteristics of hydrogen, hydrogen cycling, hydrogen trapping, adsorption, desorption, and economic considerations.

Throughout the presentation, we build an understanding of the intricate processes involved in underground hydrogen storage in depleted gas reservoirs. We will explore the conversion of hydrogen and the potential sources of contamination. Additionally, we will examine the intriguing microbial activities that can have both positive and negative effects on the storage process. Understanding and controlling these activities will be essential to ensure optimal storage conditions.

Geochemical reactions will also take centre stage as we explore their role in underground hydrogen storage. We will analyze how these reactions contribute to the overall storage integrity and discuss strategies for monitoring and mitigating any potential risks. Moreover, we will delve into the characteristics of hydrogen, its cycling within the storage system, and the intriguing phenomena of hydrogen trapping.

The lecture will further explore the crucial processes of adsorption and desorption, which are vital for understanding the behavior of hydrogen within the storage reservoir. Lastly, we will touch upon the economic aspects associated with underground hydrogen storage with a simple example. Understanding the economic viability and potential benefits of this storage method will be essential for evaluating its feasibility and widespread implementation.