

Underground Hydrogen Storage in Porous Media

Introduction

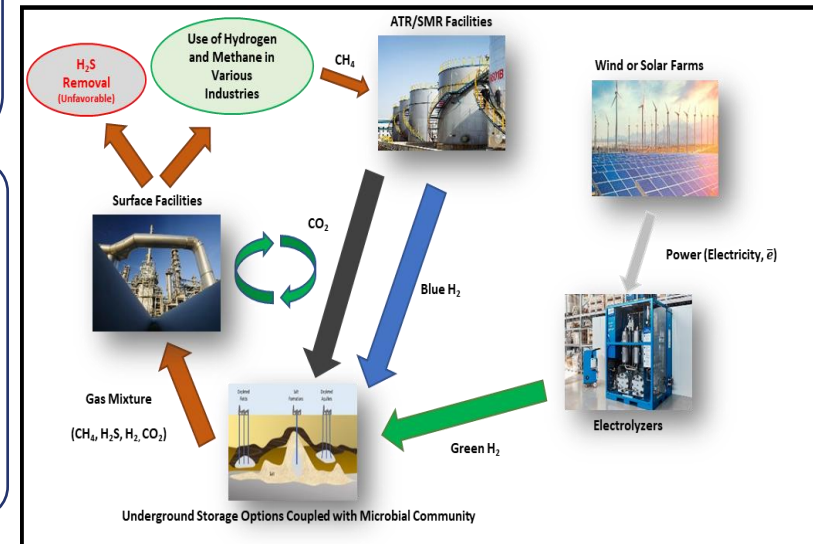
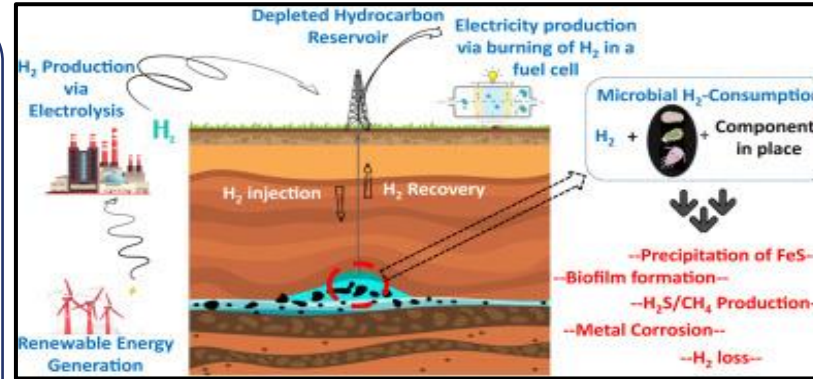
Storing hydrogen in depleted hydrocarbon reservoirs where the infrastructures are already built is a promising and safe solution to contribute to future hydrogen value chain. Porous geological settings can provide huge capacity for hydrogen storage. In order to store hydrogen in a safe and efficient way, the interaction of hydrogen with minerals, and residual fluids are necessary.

GUIDELINES

Existence of microorganisms without the need of light or oxygen in geological setting has created an opportunity for them to consume hydrogen by microbial activities. The products of these biochemical reactions, e.g., H_2S are undesirable and can be toxic and fatal. In addition, the size of hydrogen molecule is extremely small that might diffuse through caprocks or adjacent formations.

Primary objective

- Biochemical reactions
 - Evaluation of microbial activities in contact with excess hydrogen
- Diffusion and Dispersion of Hydrogen
 - Evaluation of hydrogen loss through diffusion and dispersion
- Geochemical Reactions
 - Investigation of the interaction between hydrogen and minerals



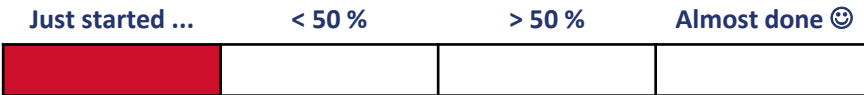
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Estimated progress of the PhD project:



Publications

- Ahmadpour, S., Gholami, R., "Hydrogen Sulphide in Underground Hydrogen Storage Sites: Implication of Thermochemical Sulphate Reduction", Journal of Energy Storage (Under Review)