

Summary

This course provides participants with understanding of geological subsurface CO₂ storage volumetrics, CO₂ flow in the subsurface away from injector wells, the objective of permanent and safe storage of CO₂. It also covers the key issues of reservoir depth, well design, reservoir lithology, reservoir quality, and reservoir architecture. Issues of mineral dissolution under different reservoir conditions are considered.

Learning Outcomes

Participants will learn to

1. Build awareness of the clastic and carbonate reservoir rocks that can be used to store CO₂
2. Consider the volumetrics of CO₂ storage and storage efficiency
3. Consider the effects of mineral dissolution by CO₂ under different reservoir conditions
4. Be aware of issues encountered in the development of CCS projects

Training Method

This is a self-paced e-learning course. Learning materials are structured into short sections, each including interactive text and image content, animations, video, and audio. An end of course quiz is scored to provide the learner with their learning progress. Approximately 5 hours learning time.

Who Should Attend

This course is designed for scientists and engineers working in the energy industry and provides a foundation in key aspects of carbon capture and storage. It forms part of a foundation programme of 4 courses: Fundamentals of CCS (EC003), Geological Storage of CO₂ (EC004), Behaviour of CO₂ in Reservoirs (EC005) and Monitoring CO₂ Storage (EC006).

Course Content

CO₂ storage volumes and controls on porosity in sandstone reservoirs

Over the duration of this module, we will explore a range of depositional, early diagenetic, and burial diagenetic factors that influence reservoir properties in sandstone reservoirs. As we explore these primary (deposition) and secondary (early and burial diagenesis) factors you will gain an appreciation of the reasons for porosity in sandstone reservoirs. Finally, we will explore the range and types (primary or secondary) of porosity in sandstone reservoirs.

CO₂ storage volumes and controls on porosity in carbonate reservoirs

During this module, we will explore a range of depositional, early diagenetic, and burial diagenetic factors that influence reservoir properties in carbonate reservoirs. As we explore these primary (deposition) and secondary (early and burial diagenesis) factors you will gain an appreciation of the reasons carbonate reservoirs tend to have lower porosity than sandstone reservoirs. Finally, we will explore the range and types (primary or secondary) of porosity in carbonate reservoirs.

Risk and rate of mineral dissolution due to CCS: calcite in sandstones and limestones

Over the duration of this module, we will explore the risks and rates of mineral dissolution due to carbon capture and storage. Our focus will be primarily on the dissolution risk of carbonate minerals in sandstones and limestones, but we will also discuss other minerals. We will discuss dissolution modeling and how these techniques can be used to enhance our understanding of CCS project risks. Finally, we will look at some field and lab based examples where dissolution has been caused by CCS.

CO₂ storage efficiency

This module will explore the phenomenon known as CO₂ storage efficiency. CO₂ storage efficiency is a very important parameter that controls how much carbon dioxide can be stored at any given site in the subsurface. We will discuss the factors that affect storage efficiency and how these factors vary in saline aquifers and depleted oil and gas fields. Finally, we will discuss some methods to determine CO₂ storage efficiency.