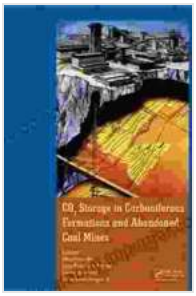
Co2 Storage in Carboniferous Formations and Abandoned Coal Mines: A Comprehensive Guide

The world is facing an unprecedented climate crisis, driven by the increasing levels of carbon dioxide (Co2) in the atmosphere. Co2 storage in geological formations has emerged as a promising solution to mitigate climate change by capturing and storing Co2 underground. Carboniferous formations and abandoned coal mines are particularly suitable for Co2 storage due to their unique geological characteristics and existing infrastructure.



CO2 Storage in Carboniferous Formations and Abandoned Coal Mines

★★★★★ 5 out of 5

Language : English
File size : 12759 KB
Print length : 216 pages

Carboniferous Formations

Carboniferous formations are sedimentary rocks formed during the Carboniferous period, approximately 359 to 299 million years ago. These formations are characterized by their high porosity and permeability, making them ideal for Co2 storage. The presence of natural fractures and faults further enhances the injectivity and storage capacity of these formations.

Abandoned Coal Mines

Abandoned coal mines offer a unique opportunity for Co2 storage due to their existing infrastructure and vast underground space. The abandoned mine workings can be repurposed for Co2 injection and storage, utilizing the existing ventilation systems, shafts, and boreholes. Additionally, the presence of residual coal and methane in these mines can be enhanced to improve Co2 storage capacity and methane recovery.

Co2 Storage Mechanisms

Co2 is stored in Carboniferous formations and abandoned coal mines through various mechanisms:

- **Structural Trapping:** Co2 is stored in the pore spaces and fractures of the rock formations, prevented from escaping by the overlying caprock.
- **Mineral Trapping:** Co2 reacts with minerals in the formation, forming stable carbonate minerals that permanently trap Co2.
- **Residual Trapping:** Co2 is trapped in the immobile phase as it is displaced by the injected Co2.

Benefits of Co2 Storage in Carboniferous Formations and Abandoned Coal Mines

Storing Co2 in Carboniferous formations and abandoned coal mines offers numerous benefits:

- **Climate Change Mitigation:** Co2 storage reduces greenhouse gas emissions by capturing and storing Co2 underground.

- **Enhanced Coal Bed Methane Recovery:** Co2 injection can enhance methane recovery from abandoned coal mines, providing a valuable energy source.
- **Economic Benefits:** Co2 storage creates new jobs and economic opportunities in the energy sector.
- **Environmental Remediation:** Co2 storage can help mitigate the environmental impacts of abandoned coal mines, such as methane emissions and groundwater contamination.

Challenges and Considerations

Co2 storage in Carboniferous formations and abandoned coal mines also presents some challenges that need to be addressed:

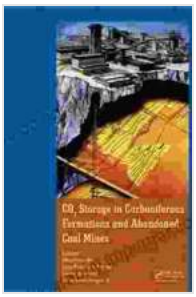
- **Site Selection:** Careful site selection is crucial to ensure the suitability of the geological formations and abandoned coal mines for Co2 storage.
- **Leakage Prevention:** Monitoring and mitigation strategies are essential to prevent Co2 leakage from the storage sites.
- **Public Perception:** Addressing public concerns and building trust are important for the successful deployment of Co2 storage projects.

Co2 storage in Carboniferous formations and abandoned coal mines offers a promising solution to mitigate climate change. The unique geological characteristics and existing infrastructure of these sites provide significant advantages for Co2 storage. By overcoming the challenges and addressing the considerations, this technology can play a crucial role in reducing

greenhouse gas emissions, enhancing energy recovery, and contributing to a sustainable future.

References

1. Intergovernmental Panel on Climate Change, "Climate Change 2021: The Physical Science Basis," 2021.
2. Global Carbon Capture and Storage Institute, "Carbon Capture and Storage in the Energy Transition," 2020.
3. European Union's Horizon 2020 research and innovation programme, "Co2 Geological Storage in Carboniferous Formations and Abandoned Coal Mines," 2022.



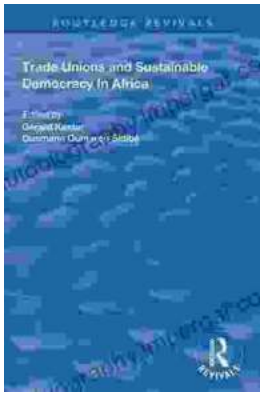
CO2 Storage in Carboniferous Formations and Abandoned Coal Mines

★★★★★ 5 out of 5

Language : English
File size : 12759 KB
Print length : 216 pages

Additional Steps By Regulators Could Better Protect Consumers And Aid

The financial services industry is constantly evolving, and with it, the risks to consumers. Regulators have a critical role...



Trade Unions and Sustainable Democracy in Africa: A Routledge Revival

Trade unions have played a vital role in the development of democracy in Africa. They have fought for workers' rights, social justice, and...