Water sampling technique paves way for safe storage of CO2

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Scientists have found an inexpensive way to monitor the storage of the most common greenhouse gas - carbon dioxide - deep underground.

Successful trials of their method at a site in Australia will inform the development of Carbon Capture and Storage (CCS) technology, in which CO2 from power stations and industrial sources is held deep underground, to prevent emissions from contributing to climate change.

In the first experiment of its kind, researchers studied the different forms of oxygen in waters sampled from rocks deep below ground at the storage site in the Otway Basin, in south eastern Australia.

They found that the reservoir's waters changed their oxygen composition when in contact with bubbles of trapped CO2. Testing samples of water for this altered form of oxygen provides a simple way to measure the amount of CO2 stored within the rock.

The study shows that injected CO2 is very quickly retained in the underground rocks, with CO2 being locked away like air being trapped within a foam sponge. The research was carried out by the Universities of Edinburgh and Australian research organisation CO2CRC.

Researchers say their technique provides an inexpensive monitoring solution, as they need only measure only CO2 injected into a site and water samples from before and after injection to find out how much CO2 is trapped.

The study, published in the *International Journal of Greenhouse Gas Control*, was supported by the UK Carbon Capture and Storage Research Centre and CO2CRC.

Dr Sascha Serno, of the University of Edinburgh's School of GeoSciences, who led the study, said: "Our results highlight the promising potential of using oxygen compositions to monitor the fate of CO2 injected underground. This method is simple and cheap, and can be easily combined with other monitoring techniques for CCS projects in the UK and beyond."

Dr Stuart Gilfillan, also of the School of GeoSciences, the study co-ordinator, said: "Understanding the fate of CO2 injected into the underground for storage is essential for engineering secure CO2 stores. Our work with our Australian partners paves the way for better understanding of the fate of CO2 when we inject it underground."

Provided by University of Edinburgh

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