

High Precision Carbon Dioxide Detection for Geological Reservoirs

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BACKGROUND

Large-scale sequestration of carbon dioxide in underground geological reservoirs is being actively explored as a means to sustain fossil energy use and minimize climate risks. Assuring the integrity of the huge carbon dioxide plume sequestered in such underground reservoirs is central to the viability and acceptability of this approach. It is known that carbon dioxide can leak from underground storage reservoirs. The U.S. Department of Energy has set a limit on carbon dioxide leak rates of 0.01 percent per year to the atmosphere. Detection of carbon dioxide leakage from non-point sources at sequestration sites is problematic because of the variability of carbon dioxide in the atmosphere due to natural ecosystem photosynthesis-respiration fluxes, variations in background air-mass trajectories, and local or regional pollution from fossil fuel combustion.

TECHNOLOGY DESCRIPTION

UC San Diego researchers have developed a method and apparatus that integrate sensor systems to enable the detection of carbon dioxide leakage from geo-sequestration sites with high precision and specificity. The invention can distinguish the addition of carbon dioxide to the area by reservoir leaks from carbon dioxide generated by combustion and other typical above-ground sources. Relative to the state-of-the-art, the invention is more sensitive and robust and does not depend on the injection of tracers to allow detection; in particular, it is more sensitive than using isotopes of carbon dioxide to fingerprint carbon dioxide leakage. The sensors of the invention can be packaged for mobile surveys of geo-sequestration sites or distributed to form an intelligent network of carbon dioxide monitors.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,359,167	01/22/2013	2008-251

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OTHER INFORMATION

KEYWORDS

carbon dioxide, CO2, geo-
sequestration, CO2 detection, CO2
sensor, climate change

CATEGORIZED AS

- **Sensors & Instrumentation**
 - Environmental Sensors
 - Other
 - Position sensors

RELATED CASES

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