

As for carbon capture, Scientists from the University of York developed an innovative new green material named Starbons which can be used in capturing emissions from power stations, chemical and other large scale manufacturing plants; U.S. technology developer ION Engineering planned to test its solvent technology at Technology Centre Mongstad; by the end of June, Air Products and Chemicals, Inc. successfully captured and transported 3 millionth metric ton of CO₂ by pipeline to be used for enhanced oil recovery. As for carbon storage, Scientists at the University of Strathclyde studied the ability of complex rock strata beneath the North Sea to trap CO₂ securely, which will help to provide the tools for selecting the most suitable CO₂ storage sites; a UK-Australian research team found that reservoir's waters changed their oxygen composition when in contact with bubbles of trapped CO₂, and the testing samples of water for this altered form of oxygen provides a simple way to measure the amount of CO₂ stored within the rock. Furthermore, Norway planned to realise CCS by 2022; CO₂CRC and Canada's Petroleum Technology Research Centre will collaborate; Global CCS Institute says that industrial emissions is overlooked in climate fight.

Europe

[Pöry Management Consulting Report Demonstrates Business Case for UK Industrial Carbon Capture and Storage](#)

2017/02/12

Against the background of an emerging UK industrial strategy and the forthcoming publication of the UK Government Emissions Reduction Plan, this new report by Pöry Management Consulting sets out the business case for an Industrial CCS support mechanism in the UK.

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[A Step Closer to Bringing CO₂ Membrane Technology to Markets](#)

2017/01/17

Air Products signs exclusive license agreement with Norwegian University of Science and Technology for membrane technology for CO₂ capture technology.

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North America

[2017 Will be the Year for North American CCS, Expert Says](#)

2017/02/08

Carbon capture and storage (CCS) in North America is about to have its year, Julio Friedmann, senior adviser for energy innovation at the Department of Energy's (DOE's) Lawrence Livermore National Laboratory, said during the February 8 Global CCS Institute's annual Americas Forum.

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[MIT and Eni Extend Energy Collaboration](#)

2017/01/17

Following a stream of research successes in breakthrough technologies in the energy space, MIT President L. Rafael Reif and Eni CEO Claudio Descalzi met on Saturday in Rome, Italy, to renew the nine-year collaboration between the Institute and the Italian energy company for another four years. The \$20 million agreement includes an extension of Eni's founding membership in the MIT Energy Initiative (MITEI) and research support for three of MITEI's Low-Carbon Energy Centers to advance key technologies for addressing climate change, in the areas of solar energy; energy storage; and carbon capture, utilization, and storage.

[CO₂ Solutions Taps BBA as Lead Engineer for Saint-Félicien Carbon Capture and Reuse Project](#)

2017/01/16

BBA has been hired as the lead engineering firm for CO₂ Solutions Inc.'s first commercial carbon capture and reuse facility. It is located at a pulp mill in the Saint Félicien region of Quebec.

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Asia

[The Potential for Carbon Capture and Storage in China](#)

2017/01/17

Continued heavy dependence on coal for electricity generation is one of the world's top environmental challenges and yet the future of coal depends largely on only one country. China is simultaneously the world's leader in renewable electricity capacity and the world's largest emitter of energy-related carbon dioxide, with around half of these emissions coming from coal-fired power stations.

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Global

[Invest in CCS before Renewables, BHP Tells Leaders](#)

2017/02/08

BHP Billiton has called for climate policy that does not favour renewable energy over carbon capture and storage, calling on governments to promote and invest in CCS as a way to help reduce emissions, meet climate targets and support global jobs. In the wake of Malcolm Turnbull's call at the National Press Club last week for energy policy to be "technology agnostic", BHP has called for more action from governments around the world to support CCS, which it says will be crucial to meeting targets agreed to in Paris in 2015.

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Reviews of Research Papers and Reports

[Study on Properties of Mesoporous SiO₂/polyethylene Polyamine Composite Solid Adsorbent for CO₂ Capture](#)

Fengjing Jiang, Qingchun Yu 2016/12

Based on the fact that the conventional liquid adsorbents for CO₂ capture are usually energy-consuming and highly volatile, the solid-state adsorbent was developed by mixing the mesoporous SiO₂ with polyethylene polyamine, where mesoporous SiO₂ was prepared by using phosphoric acid as pore-forming agent and the average pore size of the SiO₂ can be well controlled in the range of 2-6 nm. Due to the huge specific area of the solid-state adsorbent, high CO₂-absorbing efficiency was achieved. The effect of adsorbent composition on adsorption efficiency was studied. And the impacts of temperature on CO₂ adsorption and regeneration as well as its evolution with time were also investigated. The results show that CO₂ can be completely adsorbed. When the mass ratio of polyethylene polyamine to SiO₂ is 20% and the temperature is 60°C, the adsorbent shows the best CO₂ adsorption ability.

[Study on CO₂ Adsorption with Activated Carbon Alkaline Cleaned and Modified under Ultrasonic Condition](#)

Fubao Zheng, Rongying Lin, Pan Yang 2016/12

In this experiment, coconut shell activated carbon particles were used as the carriers, the activated carbon particles alkaline cleaned and modified under ultrasonic condition were used for the adsorption of CO₂ gas. This paper focuses on the influences of alkaline agent concentration and ultrasonic time in the process of alkaline cleaning of activated carbon, and the influences of the stirring time, ultrasonic time and modifying agents in the process of modification of activated carbon. The alkaline cleaned and modified activated carbon particles were characterized by TGA and ASAP2020. The results show that the adsorption capacity of CO₂ gas of the modified activated carbon particles was 1.5 mmol·g⁻¹ when the alkaline cleaning conditions were KOH solution of 5 mol·L⁻¹ and ultrasonic time of 120 min, and the modified conditions were stirring time of 30 min, ultrasonic time of 100 min, and 10% (mass fraction) potassium carbonate as modifier. Research shows that ultrasound could promote the dispersion effect of alkaline agent on activated carbon pore, so that the pore cleaning

effect on activated carbon would be enhanced. Besides, modifiers were distributed in pores very well by ultrasound, thus the adsorption performance of modified activated carbon particles for CO₂ gas could be improved. However, when ultrasonic time was too long in the process of modification, the pore would be collapsed and broken into small particles, and then the adsorption property declined.

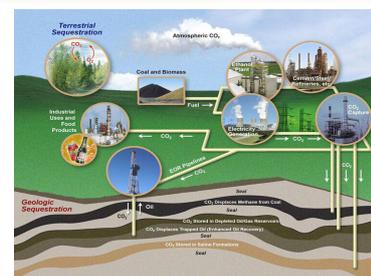
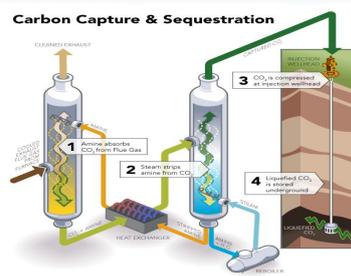
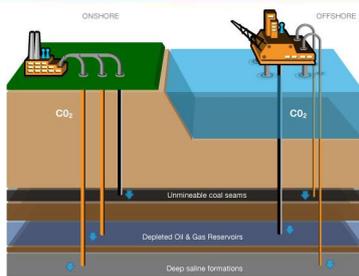
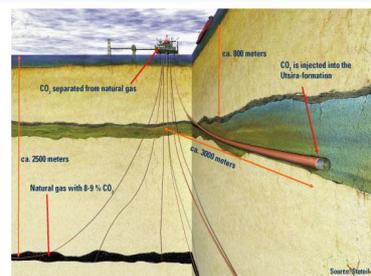
Reservoir Parameter Inversion of CO₂ Geological Sequestration Based on the Self-adaptive Hybrid Genetic Algorithm

Yanjun Hao, Dinghun Yang, Yuanfeng Cheng 2016/12

Carbon dioxide geological sequestration is an important approach to reduce carbon emission and to mitigate global warming. An important part of CO₂ sequestration is seismic monitoring, which is to monitor carbon dioxide distribution variation using the seismic method after sequestration. To achieve this goal, we need to establish the relationship between reservoir fluid saturation through inversion of seismic monitoring data. First, based on the Biot model and multiphase model, we investigate the effects if several physical parameters (porosity, CO₂ saturation, temperature and pressure, et al.) on seismic properties such as wave velocity and attenuation of carbon dioxide and water saturated porous media to obtain the regular understanding. The results show that porosity and CO₂ saturation have a huge impact on the properties of wave dispersion and attenuation, and temperature and pressure can affect the rock velocity through the properties of porous fluids. Next, based on Biot theory with multiphase flow, we apply the self-adaptive hybrid genetic algorithm, which has stronger anti-interference capacity and better ability of local search and anti-interference, to perform inversion of actual data. The inversion of core experimental data indicates the validity of the algorithm, and shows that Biot theory with multiphase flow can explain the wave velocity characters of CO₂ and water saturated rock. At last, we apply the self-adaptive hybrid genetic algorithm to the seismic monitoring data of actual sequestration project, and obtain the CO₂ saturation distribution at different periods after sequestration and achieve the purpose of using the seismic method to monitor carbon dioxide distribution.

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