

# CO<sub>2</sub> storage in coal can be predicted better

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CO<sub>2</sub> storage in the ground is being considered increasingly more often in order to realise the climate and energy objectives. Dutch researcher Saikat Mazumder made it possible to better predict routes of the 'underground highways' along which gasses like carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) will move. Moreover, coal was found to be highly suitable for filtering carbon dioxide out of waste gasses and storing it.

The 'Enhanced Coalbed Methane process' kills two birds with one stone: carbon dioxide (CO<sub>2</sub>) is stored in coal seams in the ground and at the same time methane (CH<sub>4</sub>) is obtained from the process. To optimise this process it is important to know how coal retains and stores some fluids and gasses whilst allowing others through.

The network of cracks is essential for this. Mazumder developed a measuring technique using CT scans that led to an improved understanding of the patterns of cracks. He also did experiments with waste gas and pure CO<sub>2</sub> to determine the uptake capacity of single and multi-component gasses. In both wet and dry experiments, CO<sub>2</sub> was strongly absorbed and CH<sub>4</sub> was released. This methane production in a coal seam can vary over the course of time. Mazumder developed two estimating methods to gain a better understanding of this. When used together these could generate good predictions.

## Problems due to swelling

The research revealed that a considerable quantity of CO<sub>2</sub> could be removed from waste gas by allowing it to be adsorbed onto coal under

high-pressure. According to Mazumder this means that the injection of waste gas into coal seams can be applied to filter out CO<sub>2</sub> on an industrial scale and to retain it. Mazumder also carried out a preliminary study into the decrease in porosity and permeability as a consequence of coal swelling due to the injection of CO<sub>2</sub>. The decrease in the permeability can give rise to serious injection problems in the area of the well into which CO<sub>2</sub> is injected.

Source: Netherlands Organization for Scientific Research

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