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Ansto

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Dynamic micro-CT of gas uptake in coal

The behaviour of gases in coal is critical to processes affecting both coal seam gas extraction and carbon sequestration. These depend on the affinity of different gases for coal and the effect they have on the coal itself when adsorbed, such as causing the coal to swell.

Dynamic micro-CT offers the possibility of observing these processes on the microscopic scale as they are happening. Here we use krypton and xenon gas to explore gas uptake in five different types of coal. these gases are readily visible in micro-CT scans making quantitative analysis feasible. Krypton in particular is thought to be a close analogue for methane.

A time-series of tomographic scans of samples in containers pressurised with krypton or xenon were made over a period of three days resulting in many hundreds of tomographic datasets. Batch reconstruction and data analyses using the MASSIVE cluster enabled this large amount of data to be analysed in 3D.

This analysis has enabled us to quantify the gas uptake over time in different coal types, and to compare the behaviour of two gases with different affinities for coal. Diffusion profiles over time have also been obtained which will be used for comparison with gas diffusion models.

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Keywords or phrases (comma separated)

coal, micro-CT, in-situ, gas

Are you a student?

No

Do you wish to take part in the Student Poster Slam?

No

Are you an ECR? (<5 yrs since PhD/Masters)

No

What is your gender?

Female

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