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# New cell for studying porosity under mechanical and chemical stress

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Tracking Changes in porosity at realistic underground conditions is of great scientific and technological interest to the resource industry, underground aquifer management, and material science, to name a few. Small Angle Neutron Scattering (SANS) and Ultra-Small Angle Neutron Scattering (USANS) are complementary techniques that can non-destructively investigate open and closed pore structure information in 2nm to 20μm range. The recent high-pressure cell developed by Blach is capable of applying uniaxial stress and fluid penetration of the sample with a pressure of up to 100MPa independently. This allows contrast matching and pore-fluid penetration to be studied at different mechanical loads. We report on our latest results from Quokka and Kookaburra, showing the effect of uniaxial strain on the porosity of tight shale rock. As we are in the process of extending the capability of the cell to temperatures above 500℃ and adding triple axial strain capability, we also report on the optimization of sample thickness and windows. Moreover, we report on additional cell extension work that allows diffraction and X-ray/neutron Tomography to be used to study the samples. We are developing the new capabilities in cooperation with ANSTO, and we hope to have the system available to general users in 2022.

## Speakers Gender

Male

## Level of Expertise

Student

## Do you wish to take part in the poster slam

No

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