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Argon beam cross sectioning and SEM imaging porosity in sandstone tight gas reservoir: first results

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Extracting value from tight gas reservoirs, which contain large accumulations of hydrocarbons, represents a challenge for the entire oil industry to give a substantial boost to the world's reserves. The development of new technologies to enhance tight gas reservoir productivity is strongly dependent on a high-resolution understanding of the porosity.

Numerous methods are now available to characterize sandstone cores. However, the pore space characterization at pore scale remains difficult due to the fine pore size and delicate sample preparation, and has been mostly indirect until now.
Thus, we propose a new alternative method combining high resolution SEM and argon ion beam cross sectioning (BIB, Broad Ion Beam) to prepare smooth and damage free surfaces.

By using this method, we report on a study of two dried Rotliegend sandstone core samples (from Bahnsen and Wustrow members). We show that the combination of Ar-beam cross-sectioning facility and high-resolution SEM imaging has the potential to result in a step change in our understanding of porosity, its morphology, spatial distribution and evolution, as well as bringing unprecedented clarity, resolution and predictive reliability.
Our first investigations give also a first overview of the diagenetic processes occurring in the selected samples as well as the fine characterization of porosity.