439a Gravimetric Measurement of Coal Adsorption Isotherms

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The need for significant reduction of CO2 emissions is the key driver for the study of technological options that would allow the use of fossil fuels coupled with capture and sequestration of CO2. In view of the scale of the task, only geological structures provide sufficient capacity and among these CO2 sequestration in coal reservoirs is of interest since it provides a safe way of physically binding the CO2 in the coal matrix. This storage option is currently being used to recover methane which is displaced by the more strongly adsorbed CO2, and the methane production can offset part of the sequestration costs. Coal is a non rigid material showing a measurable swelling upon adsorption of CO2 and CH4 and this effect has to be included in order to correctly estimate coal adsorption properties. Coals from shallow coal mines of Ohio (150 meters) and deep coal mines of Poland (1000 meters) have been investigated by employing a gravimetric technique and both adsorption and swelling phenomena have been included in the data analysis. Experimental results for CO2, CH4 and N2 are reported for pressures up to 150 bars at temperatures between 35ºC and 55ºC.