



Effect of textural properties on methane sorption potential of shales

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Shale gas is a new source of fossil energy that is of great interest at the present time. Determination of the sorption capacity of shales belongs to basic criteria for evaluation of capacity of their exploitable deposits. The variability of the geological and physical parameters in a shale gas basin leads to the formulation of more general factors affecting the sorption capacity of shales, e.g. an increased content of total organic carbon (TOC) and some clay minerals, degree of maturation, and pore distribution. However, the mechanisms of gas storage in shale systems are still poorly understood. It is thought that a major part, up to 85 %, of shale gas can be stored as sorbed gas. Methane sorption capacity is therefore considered as a key indicator of the gas capacity of shales. Experimental equipment and procedures that were developed for studying the deposition of carbon dioxide into coal are used for determining the amount of sorbed gas in geological samples under conditions similar to those found in situ. The Czech Republic has been characterized only superficially from the standpoint of potential shale gas deposits. The Prague Basin is a locality where gas-bearing shales are expected to exist. Our study makes a detailed sorption and textural characterization of samples of Silurian shales from the Prague Basin. The methane sorption capacities of six shale samples with mean light reflectance values of vitrinite within the range $R_o = 0.8 - 1.25$ % have been determined using a high-pressure manometric apparatus under temperature and pressure conditions corresponding to the maximum thickness of the sedimentary filling of the Prague Basin. The basic characterization of the samples involved determining their TOC values. The textural characterization included determining micro-, meso- and macropore volumes, and determining the specific surface (BET). It has been found that a) the sorption capacities increase with increasing micropore volume, b) the dependences of the sorption capacity on maturity (R_o) and on the TOC value show a slightly positive trend, and c) the dependence of micropore volume on TOC value shows a negative trend.