



The role of microfractures in shale rocks

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Measurements of reservoir rock permeability have been conducted in the oil industry for several decades. Depending on the type of permeability, oil and gas reservoirs can be divided into those with pore reservoirs, pore – fracture reservoirs and fracture reservoirs. In practice, pore and fracture permeability are observed in all unconventional reservoirs with varying shares of either type. Natural microfracture systems increasing the permeability of the rock matrix are also recorded in shale rocks

In this paper anomalous results of permeability for rock samples from shale formations have been analysed. Observations with the use of SEM and petrographic microscope allow us to distinguish microfractures generated as a result of decompression of rocks (change of stress) and natural ones. The fractures generated as a result of core decompression are usually associated with very fine laminations with a material of different grain size composition comparing with rock matrix (smaller or larger grains), or with clay laminations within mudstones (author's microscopic observations).

It has been concluded that the microfracture systems present in the examined rocks are the reason of the anomalous values of permeability measured by the Pulse-Decay method. Dependences of overburden pressure on fracture permeability have been analysed. Simulative research performed for plug-type core samples allowed us to obtain permeability values in a function of the microfractures width.

Finally, dependence of reservoir conditions on fracture width as well as on porosity was examined.