Vein distribution within the gas bearing shale formations in the Palaeozoic Peri-Baltic Syneclise, Poland

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The veins were observed in core samples from the shale formations of the Palaeozoic Peribaltic Syneclise in onshore Poland. The region is generally aseismic without present-day active deformation. Upper Ordovician and Lower Silurian rocks are the most prospective gas bearing sequences. The rocks occur at depths of 2800-3970 m and spread out laterally for several hundred kilometers. According to Blatt's classification, they include mudstones and claystones enriched in detrital quartz. The rocks are characterized by sufficient thermal maturity and average total organic contents around 1% [1]. Appearance of veins in the gas bearing mudstones and claystones is rather infrequent. Two types of the veins were identified in the rocks: sub-perpendicular or slightly oblique to the bedding, associated with fractures (type 1) and lenticular in shape, sub-horizontal, parallel to lamination (type 2). Type 1 veins dominate within the rocks and can be traced along several meter-long core intervals. The veins vary in width from 0.01 to 8 mm and they are predominantly infilled with calcite, only occasionally by quartz. Some of them reveal crack-seal textures [2] within blocky and elongated crystals. Part of the veins are arranged in *en echelon* arrays.

Natural fracture networks are relevant elements that influence the effectiveness of extraction of unconventional gas from shales [e.g. 3]. They allow for recognizing of the mechanical properties of rocks and facilitate estimating the level of interaction between the induced fractures and the natural fracture network. The rocks studied commonly show open technological cracks along the vein boundaries, within the veins, and along the bedding or initial shear surfaces. All observed microstructures require a detailed description and origin assignment because they are crucial for further analyses.

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