

GRAIN SIZE ANALYSIS AND MINERALOGY OF THE TREMADOCIAN DICTYONEMA SHALE IN ESTONIA

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The Tremadocian black shale or so-called Dictyonema shale of Estonia consists of 65–70 % mostly silicate minerals, 10–15 % organic and 10–20 % X-ray amorphous matter. Grain size and the quantitative analysis of silicate minerals in black shale was carried out. After disintegration of shale it was found out that siliceous crystalline part contains 70 % silt-sized and 30 % clay-sized particles. Sand-sized particles are in negligible amounts. The composition of the silicate minerals is rather uniform: up to 40 % clay minerals (mainly illite and illitic illite-smectite) and micas, over 30 % K-feldspar and almost 30 % quartz. However, gradual changes in grain size and mineral composition occur laterally as well as vertically.

Grain size distribution of K-feldspar and quartz in the shale is unimodal and closely similar; both minerals are most frequent in the 5–10- μ m fraction. Most of the K-feldspar, especially in the <10- μ m fraction, is authigenic as recognised by its euhedral non-altered crystal form. XRD-analysis revealed that this K-feldspar is a monoclinic low sanidine.

Thus, we cannot draw far-reaching conclusions about the sedimentation process based on grain size analysis of the Dictyonema shale, but conclude that silicate grains in Dictyonema shale are reflecting most of all the kinetics of diagenetic processes.