ABSTRACT

This work is devoted to the petrographic characteristics of dispersed organic matter in the Menilite Beds of Skolska, Silesian and Dukla Units. Its purpose is to supplement the ongoing research on this one of the most interesting formations within the Carpathian Mts. with aspects of organic matter petrography, with the background of both petrographic studies of mineral content as well as geochemical investigations.

The main emphasis was placed on microscopic observations - the maceral composition of the rocks was characterized, the maturity level of organic matter was determined by measuring the reflectance of vitrinite fragments and also lithological aspects were described. The results were supplemented with data obtained from the Rock-Eval pyrolytic analysis, in particular parameters such as T_{max}, TOC (content of organic carbon), HI (hydrogen index) and OI (oxygen index) were used. The relationship between the obtained results was examined, especially in terms of the relations between the maceral composition, geochemical parameters and lithology. All obtained results were traced both on outcrop and unit scale. Despite some limitations of the methods used, paleoenvironmental issues were also referred to.

The rocks collected within Menilite Beds are characterized by various lithology. These are mainly different types of shales (clay, marly, carbonate). Mudstones, sandstones, siltstones, cherts and micritic limestones are also present, but their content is lower. The richest in organic matter are shales and mudstones, while in the case of sandstones, siltstones and cherts its content is significantly lower. In the qualitative composition of organic matter, the following association is most often observed: alginite + bituminite + liptodetrinite + collotelinite + vitrodetrinite + fusinite/semifusinite/inertodetrinite. In few rocks some of the components are missing, however it is not common. The maceral composition is most often dominated by macerals of the liptinite group - alginite, bituminite and liptodetrinite. Their content is usually much higher than macerals from the vitrinite group (represented by collotelinite and vitrodetrinite). Macerals of the inertinite group (fusinite, semifusinite, inertodetrinite) are common, but at the same time their content is very low. Solid bitumen is also present in few samples. In addition, bioclasts in the form of fish skeleton fragments are often observed.

The content of individual macerals can vary widely within the same lithology. The highest average content of alginite is observed in mudstones of the Silesian and Skole Units. The highest average content of bituminite is observed in the marly shales of the Silesian Unit and the clay shales of the Skolska Unit. Liptodetrinite is most common within mudstones

and shales of the Silesian and Dukla Units. The highest content of vitrinite is observed in clay and marly shales of the Dukla Unit.

The organic matter of Menilite Beds was deposited in shallow water marine environment, as indicated by the high content of alginite. This environment may have been varied in terms of oxygenation and sedimentation conditions, which may be suggested by the significant differences in the content of alginite and bituminite.

The organic matter of the Menilite Beds mainly represents kerogen types II and III, as well as their mixture. Samples with kerogen types I and IV are rather rare.

In the most of outcrops, the organic matter of the Menilite Beds is in the immature phase. In the Skole Unit, no organic matter being in "oil widow" phase is observed. In the Silesian Unit, samples with a higher degree of thermal transformation are found in so-called pre-Dukla zone. Apart from the mentioned zone, samples with the maturity level between immature stage and early oil generation phase are only incidentally observed. In the Dukla Unit, rocks with organic matter being in the oil window phase are observed in the Świątkowa tektonic window. Increased maturity is also suggested by Rock-Eval pyrolysis results for rocks collected from the southernmost outcrop (Komańcza 2). No regional trends in the variability of T_{max} and R_o parameters are observed.

The best generation potential is observed for mudstones and some of the clay shales (especially in the Skolska and Silesian Units). On the other hand, rocks with poor generation potential are cherts, sandstones and siltstones. However, lithology itself cannot directly indicate the generation potential, as this can change in a relatively wide range within the same type of rock.

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