Geochemical evaluation of the Veřovice Shales in the western part of the Carpathians

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The Veřovice Fm strata occur in the Silesian and Subsilesian nappes of the Western Outer Carpathians from Veřovice (south of Štramberk, Moravia) up to the area south of Kraków. Among the Veřovice Fm rocks, predominant are black claystones, often siliceous, with layers and concretions of spherosiderite. Their thickness reaches 250-500 m. The rocks under the studies constitute the uppermost part of the formation and are dated as the Late Aptian – Early Albian. The Veřovice Fm strata represent the global anoxic event OAE 1b. Anoxic conditions of sedimentation, together with low sedimentation rate and low supply of terrigenous material, were advantageous for deposition and preservation of organic matter.

The Veřovice Fm rocks were sampled in the Silesian Unit. Measured total organic carbon content (TOC) is significant and exceeds 4%, with the mean of about 1%. Particularly high TOC was observed in sections of Lipnik near Bielsko-Biała. Comparably high values were recorded in sections of Rzyki near Andrychów where TOC ranges from 0.38 to 3.0 %. The obtained results correspond to the known measurements carried out for the Veřovice strata in Zasań near Myślenice (1.56 to 3.72%) and in Veřovice (0.31 to 3.66%). Such organic carbon contents, as well as the hydrocarbon contents (S_1+S_2) reaching 7 mg/g rock, evidence good source potential of this formation. Results of the Rock-Eval pyrolysis matter in the Veřovice Fm reveal Type III kerogen with exceptionally low hydrocarbon potential determined by the hydrogen index. Results of the analysis of *n*-alkanes and isoprenoids suggest admixture of Type II kerogen. This has been indicated, among others, by maximum in the range of long-chain hydrocarbons and values of CPI lower from one or equal to one, which are characteristic of hydrocarbons generated by organic matter deposited in sediments having acid matrix. Thermal maturity of the claystones indicate a very wide range of maturity, from the initial stage of the "oil window" (435 – 450 °C) up to the initial stage of the "gas window" (>465 °C). Also values of reflectance $R_{cal\ (MPI)}$ calculated on the basis of the aromatic compound analysis are varying widely, from about 0.9 to 1.5%. The values of thermal maturity univocally indicate effective source potential of the Veřovice Fm.

The above results of geochemical studies evidence that the Veřovice Fm. may represent potential source rocks for systems that comprise reservoir rocks of different ages in the Outer Carpathians.

Gem mınerals and materıals from the Neolıthıc and Chalcolıthıc perıods ın Bulgarıa and theır ımpact on the hıstory of gemmology

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Studies of prehistoric (Neolithic to Chalcolithic period) artefacts from the territory of Bulgaria during the past decade revealed a lot of specific gem and decorative minerals and materials: nephrite, malachite, serpentinite, turquoise, jadeite, jet, carnelian, agate and jasper (including heliotrope). Nephrite artefacts in Bulgaria, as well as in some other countries on the Balkans, are widespread during the Neolithic and rare during the Chalcolithic – the nephrite sources are under discussion. A Balkan "nephrite culture" is introduced, which is supposed to be the earliest in the world, compared to the well known Chinese "nephrite cultures". The Varna Chalcolithic necropolis (middle of the V mill. BC) is known with the earliest and largest amount of gold artefacts in the world, including also some copper objects from the copper mines near Stara Zagora. A large amount of beads are also identified as made