ORGANIC MATTER MIGRATION IN THE TECTONIC ZONES OF THE POLISH WESTERN TATRA MOUNTAINS

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The crystalline basement of the Polish part of the Western Tatra Mts. is cut by shatter zones and faults running SW–NE. Some of these tectonic zones cut the Mesozoic sedimentary cover, trending further to NE. In the mylonitized rocks in the tectonic zones the presence of dispersed extractable bituminous organic matter was shown using Oxyreactive Thermal Analysis.

The oxyreaction patterns are characterised by the endothermic peaks in the range of 240–290 °C, while the exothermic (oxidation) reactions took place in the range of 300–320 °C. Such oxyreaction patterns suggest the susceptibility of parent organic matter to high temperature pyrobitumen formation.

Dry powdered samples were extracted in dichloromethane and fractionated into aliphatic, aromatic and polar organic fractions using thin-layer chromatography. GC–MS analyses of aromatic and aliphatic fractions show that all samples are on much the same level of maturity. In the saturated gas chromatogram n-C_{17} and n-C_{18} n-alkanes predominate. The pristane (Pr) to phytane (Ph) ratio is about 1. The m/z 191 mass fragmentograms of the aliphatic hydrocarbon fraction of all analysed samples show the high abundance of pentacyclic triterpanes and tricyclic terpanes (C_{23} is dominant) with lower amount of tetracyclic terpanes. The m/z 217 mass fragmentograms display high abundance of diasteranes and low molecular weight steranes (pregnanes) in relation to regular steranes. The biomarker analysis showed no evidence of higher plant material occurrence and this, together with a very low ratio of dibenzothiophene to phenanthrene (HUGHES *et al.*, 1995), suggests marine, oxic shale environments of the source rocks formation.

The theoretical value of vitrinite reflectance, based on metyldibenzothiophene ratio (RADKE *et al.*, 1986, RADKE & WILLSCH, 1994) are in the range of R_{cs} = 0.75–0.82 %, which indicates the oil window thermal conditions for hydrocarbons generation.

The investigated hydrocarbons are allochthonous in character, probably migrated through the shatter zone and faults from an unknown source.

References

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