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Organic geochemical study of domanik deposits, Tatarstan Republic.

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High-bituminous argillo-siliceous carbonate deposits of domanik formation (DF) occurring within pale depressions and down warps in the east of the Russian platform are treated by many investigators as a main source of oil and gas in the Volga-Ural province.
In this study a special attention was turned to organic-rich rocks DF witch outcrop in the central part (Uratminskaya area 792, 806 boreholes) and in the west part (Sviyagskaya, 423) of the Tatarstan Republic.
The aim of the present paper is to characterize the organic matter: origin, depositional environments, thermal maturity and biodegradation-weathering effects.
Nowadays the most informative geochemical parameters are some biomarkers which qualitatively and are quantitatively defined from distributions of n-alkanes and branched alkanes. Biomarkers – it's original fingerprints of biomass of organic matter, that reflect molecular hydrocarbonic structure. The bulk, molecular composition of oil is initially a function of the type and maturity of the source rock from which it has been expelled, while the source rock type reflects both the nature of precursor organisms and the conditions of its deposition.
Methodology used in this study included sampling, bitumen extraction, liquid-column chromatography and gas chromatography/mass spectrometry analyses. The bitumen was fractionated by column chromatography on silica gel. Non-aromatic or alifatics, aromatics and polar compounds were obtained.
Alifatic were analysed by gas chromatography/mass spectrometry Percin Elmer. The hydrocarbons present in the sediments of DF and have a carbon numbers ranging from 12 through 38. The samples contain variably inputs from both terrigenous and non-terrigenous (probably marine algal) organic matter as evident in bimodal GC fingerprints of some samples. Pristane and phytane, also, occur in very high concentration in sample extracts. The relatively low Pr/Ph ratios, CPI and OEP<1 imply that the domanik organic matter was deposited in reducing environments.
Mass chromatograms show the distribution of regular steranes, iso-steranes, lower molecular weight C21 and C22 steranes (pregnanes) (m/z 217) and triterpanes (m/z 191). The biomarkers distribution of the domanic samples generally suggests a major marine phytoplankton contribution relative to terrigenous land plant source input. The marine affinity is evident from the relatively abundant C27 steranes, which are biomarkers for marine algal contribution to organic matter and low C29 sterane contens.
In this present study, samples are dominated by 5, 14, 17 (H)-20R and 5, 14, 17 (H)-20R steranes (biological configuration). The ratios of 20S/(20S+20R) for C29 steranes and /(+) for 5-C29 steranes in the samples, are 0.21 to 0.55 and to 0.12 to 0.50, respectively. The thermal maturity level, assessed by values of several biomarker parameters has been estimated to be within end of diagenesis/eginning of catagenesis and correspond to theoretical vitrinite values (R0) in the range 0.57-0.65%.