Geophysical Research Abstracts,
Vol. 11, EGU2009-7906, 2009
EGU General Assembly 2009

The usage of high frequency EPR spectroscopy of natural carbohydrate systems with various degrees of metamorphic transformations

V. Izotov (1), P. Izotov (2), G. Mamin (3), S. Orlinskii (4), A. Orlinskii (5), M. Salakhov (6), N. Silkin (7), and L. Sitdikova (8)

(1) Kazan State University, geology, Kazan, Russian Federation (sitdikova8432@mail.ru, +7(843)238-84-71), (2) Kazan State University, geology, Kazan, Russian Federation (sitdikova8432@mail.ru, +7(843)238-84-71), (3) Kazan State University, geology, Kazan, Russian Federation (sitdikova8432@mail.ru, +7(843)238-84-71), (4) Kazan State University, geology, Kazan, Russian Federation (sitdikova8432@mail.ru, +7(843)238-84-71), (5) Kazan State University, geology, Kazan, Russian Federation (sitdikova8432@mail.ru, +7(843)238-84-71), (6) Kazan State University, geology, Kazan, Russian Federation (sitdikova8432@mail.ru, +7(843)238-84-71), (7) Kazan State University, geology, Kazan, Russian Federation (sitdikova8432@mail.ru, +7(843)238-84-71), (8) Kazan State University, geology, Kazan, Russian Federation (sitdikova8432@mail.ru, +7(843)238-84-71)

Electron paramagnetic resonance (EPR) is widely used in various fields of geological and crystallographic research, concerning studies of the thin details in minerals. Its effectiveness is highly useful for investigation of nanomineral geological objects, which are very common in nature. The pulse methodology of EPR observations on higher frequencies (>95GHz) is used widely. Consequently this allows for the received data to be worked out in detail.
The results of EPR investigations of nanostructures in crude oil, bitumen and rock coal of different degrees of metamorphosis are presented in this work.
1. EPR spectra of rock coal of Pervomajskoe deposits (Kama coal basin, Visej layer) have a relatively simple character which is caused by the free radicals. The two types as minimum of free radicals are characterised by the time of longitudinal relaxation (1(I)=11,5 [U+F06D]s and 2(II)=57 [U+F06D]s).
2. The spectra of bitumen (high degree metamorphosis of oil) from the Ashal'chinsk deposit are characterised by the free radicals with long times of relaxation (1(I)=7 [U+F06D]s and 2(II)=248 [U+F06D]s) at room temperature.
3. Spectra of heavy oil (Shija deposits) are characterised by the intermediate times of relaxation (1(I)=5 [U+F06D]s 2(II)=100 [U+F06D]s) at room temperature.

The acquired results prove that the usage of high resolution EPR spectroscopy allows for display of individual characteristics of native organic substances like rock coal, bitumen and oil, as well as for determination of their metamorphic evolution degree.