



## **Characterization of oil source strata organic matter of Jurassic age and its contribution to the formation of oil and gas deposits**

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Within the frames of this work we carried out comprehensive geochemical study of high-carbon rocks samples taken from the three segments of the Jurassic system – from the lower (Kotuhtinskaya suite), from the medium (Tyumenskaya suite) and from the upper (Vasyuganskaya, Georgievskaya and the Bazhenovskaya suites), all within the north-eastern part of the Surgut oil and gas region. Altogether we investigated 27 samples.

The complex study of the organic matter (OM) of these strata included the following: chloroform extraction of bitumen, the determination of the group and element composition, gas chromatography (GC) and gas chromatomass-spectrometry (GC/MS).

These methods allow giving high quality assessments of the potential oil and gas source strata and thus identifying the possible oil and gas generating strata among them, ie, those strata that could be involved in the formation of oil and gas within the area.

As a result of this work we identified various biomarkers that allow characterizing each oil and gas source strata under the study in the open-cast of the Jurassic system:

1. Kotuhtinskaya Suite. The build-up of this suite took place in the coastal marine weakly reducing conditions. In their composition these deposits contain some highly transformed humus organic matter (gradation of catagenesis MK3).
2. Tyumenskaya Suite. Accumulation of OM in these deposits occurred mainly in the coastal marine environment with the influx of a large number of terrestrial vegetation in the basin of deposition. As for the type of agents – it is a humus or sapropel-humus OM with a rich content of continental organics. Source type of this OM is mixed - bacterial and algal. OM of the rocks of Tyumenskaya suite is situated in the area of high maturity (stage of catagenesis at MK3 level).
3. Vasyuganskaya Suite. In this case the accumulation of OM occurred mainly in the laguna (lake-delta) weak-reduction close to oxidative conditions with the influx of bacterial matter and the continental organics to the composition of the original substance. Thus the type of organic matter of these deposits is humus. According to all information received, organic matter of the rocks of Vasyuganskaya suite is catagenetically poorly transformed.
4. Georgievskaya suite. Accumulation of OM in this strata occurred in shallow marine strongly reducing conditions. According to its type, this matter is sapropel, and plankton-algal composition was the source material for it. Its accumulation occurred in terrigenous clay sediments. Organic matter of Georgievskaya suite is situated in the area of moderate maturity. Also the traces of oxidation and of some contribution of ground vegetation were revealed in the OM, all that somewhat reduces the oil and gas generating potential of this strata.
5. Bazhenovskaya suite. The organic matter under the study accumulated mainly in shallow marine reducing conditions. Some small residue of ground vegetation is detected in the deeper layers. The type of the Bazhenovskaya suite organic matter is defined as sapropel. The source matter for this organics is a mixed - bacterial and algal type. OM is characterized of sufficiently high maturity.

Thus, as a result of the complex geochemical studies several strata that might participate in the formation of oil and gas deposits were revealed. These strata include Tyumenskaya suite of the middle segment, Georgievskaya the Bazhenovskaya suites the upper segment of the Jurassic system. Composition of the OM of these strata, the conditions of accumulation and the degree of their catagenetic transformation allows us to label them as having great potential, and as probably effective oil source strata