

Lithogeneous fissility of Maikop deposits of the Black Sea shelf

Mayevskyy B.Y., Melnychuk P.M., Kurovets S.S., Zderka T.V.

Maikop deposits contain approximately 40% of hydrocarbons reserves of the Azov-Black Sea Region. On the Northeastern Shelf of the Black Sea Maikop deposits thickness is 0-800 m, in the axial part of Indolo-Kuban Depression it reaches 4000-5000 m. Hydrocarbons deposits are confined to terrigenous reservoirs which were formed in sandy-aleurolitic assises of Maikop bottom.

Aiming at reservoir structure research, we explored sections of core samples taken from the following wells: Olimpiysk-400, Bezimyanny-2, Odessa-2, Odessa-20, Desantnyy-1, Subbotin-1 and Subbotin-403. The manufactured samples were researched with the help of polarizing, luminescent and digital microscopes.

Conducted lithologic-and-petrographic explorations, using a complex of microscopic research of Maikop container rocks in cores and thin rock sections, prove a wide development of lithogeneous cracks, opening of which is, as a rule, the first tens of micrometers, that apparently influences filtration-capacitive properties of these deposits.

Terrigenous reservoirs of the Black Sea Shelf are basin formations, organic substance sank in the process of their sediment growth together with detritus sedimentation. Organic substance is represented in thin rock sections with layers from 0,01 to 0,02 mm of brown, light-brown, sometimes black color, depending on the extent and character of its transformation. Destruction resistance of sandy-aleurolitic layers with increased organic substance content is less comparing with massive matrix of container rock. Evidently, when sufficient stresses appear in container rocks, microcracks emerge. As a result of this, container rock divides into layers causing increase of its capacity due to formation of layerwise lithogeneous fissility.

Short-time oil surges from Lower Maikop deposits in Subbotin area wells with approximate flow rate 80 m³/day, which have dramatically dropped with the lapse of time, are connected, to our mind, exactly with lithogeneous cracks of stratum and their fast closing in case of effective pressure rise in well bore zone.

Lithogeneous fissility is mainly typical for layered sandy-argillaceous strata, especially for zones of granulometric composition change in them. Though, there are also models of lithogeneous fissility development in massive sandstones assises of Maikop deposits.

Heightened concentrations of hydrocarbon components are usually confined to such cracks of lithogeneous kind, that creates layered structure of samples.

Special attention should be paid to lithogeneous cracks along the stratum in argillites assises. In case a system of such cracks develops, there appear decompression zones and correspondingly intervals of possible productivity in the section. In our opinion, hydrocarbons surges from clay parts of Maikop deposits are connected exactly with such zones.

Establishment of dominant type of void and its oil-gas saturation should be a necessary precondition for grounding exploratory works and implementing measures aimed at using oil-and-gas deposits as well as intensifying hydrocarbons surges to production wells.