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Pyrite origin in argillites of Bobrikovskian horizon from incised-valley system zone

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Pyrite is the important reductive condition indicator in sedimentary rocks. These conditions may be a consequence of existed oil pools and may serve as a reconnaissance sign.
In this project the objects of research were pyritized argillites of Bobrikovskian horizon from well cut (well #4021 east side of Melekess cavity, South Rzhavetskiy oilfield). Observed sediments are spaced inside Visean incised-valley system.
Sedimentary history of Visean incised-valley system is characterized by a combination of superposed rock forming, and syngenetic and epigene processes. This includes the processes under the influence of hydrocarbons. Methods of primary and secondary pyrite recognizing are urgent problems, especially when using pyrite anomalies while searching for characteristic of oil deposits.
In the frames of this project we observe basic methods of this sedimentary pyrite research including measurements of magnetic susceptibility and X ray-structural method.
After processing and interpreting the data of the measurements the following facts, patterns, relationships came to light: appropriate growth of magnetic susceptibility is observed for each pattern heated to 400° and under 500° pyrite turns into magnetite.
The main indicator of pyrite dispersibility is difference in magnetic susceptibility values measured under low (LF) and high (HF) frequency in magnetic fields. We use a self-relative difference indicator of magnetic susceptibility calculated with the following equation: (LF-HF)/LF. This indicator is related to the content of super-paramagnetic particles in rocks. The higher the values of an indicator mean that the rock contains the higher quantity of dispersed pyrite, i.e. “quick” pyrite. High values are recognized in the lower section of argillite layer (max on 1141, 8m in depth). Thus, lower section of argillite (1141, 6-1142 m) originated in strong reductive conditions, but upper section was in relatively weak reductive conditions where microcrystalline particles of pyrite occur more often. Hence, it admits existence of more close relations between observed rocks and lower embedded oil reservoir.
After interpretation of X-ray analysis data was determined that
very low quantity of kaolinite indicates biogenous wasting of silicates in the rock.Presentence of jarosite also was established.These facts can be interpret that filtration of hydrocarbons took place in this rock.The more profound studies show that the rock on the depth of 1141,4 m originated under hydrocarbon’s migration in less degree what was proved by magnetic data as well. Low values of (LF-HF)/LF parametr are observed what mentions on lesser quantity of disperse (secondary) pyrite.
Thus, it may be supposed that there are two zones of piritization within explored interval of argillites: lower (1141,6- 1142m) and upper (1141, 2 - 1142, 6 m). In lower zone pyrite was formed in stronger reductive conditions than pyrite of upper zone. It may be supposed about primary influence of hydrocarbons on lower zone from the side of lower deposit. Probably, pyrite largely has authigene matter in upper zone.