The Role of Electromagnetic Field in Changing Physical-Chemical Properties of Oil

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In our project we present new method for increasing oil production by changing physical-chemical properties of oil with external electromagnetic field. As a result of the implementation of the project, the fundamentals of new effective technologies for managing the physical and chemical properties of oil (viscosity, magnetic properties, paraffin deposition and etc.) have been developed. Implementation of the project will help to increase oil production of wells and ensure uninterrupted supply of oil through pipelines. Analysis of compound, structure and characteristics of oil samples taken from various 15 oil fields of Absheron Peninsula in Azerbaijan have been taken into consideration and executed. Iron oxide magnetic nanoparticles were found in 30% of the studied oil samples. In the research process, number of complementary modern physical, biophysical and physical-chemical methods have been used. 1) EPR; 2) Microscopy (optical, electron); 3) Viscosimetry; 4) IR spectroscopy. By EPR have been detected magnetic nanoparticles in oil samples from some oil deposits of the Absheron Peninsula. Using the method of Transmitting Electron Microscopy (TEM), are determined the structures and size of magnetic nanoparticles. The structure and physico-chemical properties of oil were investigated by Viscosimetry and IR spectroscopy. In some oil samples, a large EPR signal characterizing magnetic nanoparticles was observed (g = 2.3; ?H ˜ 320 Qs). The results can be recommended as an economically viable and environmentally friendly technology for oil refining in order to increase oil extraction of wells, to ensure uninterrupted oil transportation through pipelines and to drastically change oil specificity using physical and chemical effects.

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