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The role of nanosystems in oil and gas production

Today nanotechnology is one of the prospective and rapidly developing areas in the world. Innovative technologies aimed to improve efficiency and reduce costs in the oil and gas industry are also being developed in Azerbaijan. Development, research and application of nanotechnologies from the series of innovative technologies are of topical issues. Prevention of salt and sand deposition, development of hardly extractable residual oil reserves having non-Newtonian properties, protective actions against the corrosion and paraffin deposits particularly in the oil and gas production, are the problems that need to be solved. To study the effects of the developed metal nanoparticle based nanosystems in the hydrocarbon medium, the studies have been carried out on the reservoir-well system simulation model, and the mechanics of motion in three phases- oil, gas and water were studied. Based on conducted extensive analytical research the changes of the rheological properties of oils after nano-effect were confirmed, and the obtained stable and sustainable nanosystems have been revealed. As the use of these technologies enables an increase in recovery factor and carrying out development processes in more effective way, they are applied in the field-industrial scale in the under mentioned areas, and high efficiency is achieved. Areas include: An extraction of residual oil reserves; the prevention of sand flow from the formation to the bottom of the well; and the elimination of salts formation in the collectors, discharge lines of wells and lift pipes. As a result of the application of developed nanosystems, oil production increased by 10-15% according to the directions, the interrepair period of wells increased, repair-related waste of time is limited, additional expenses and labor costs are reduced, and the period of operation of the downhole equipment and transportation systems is extended.

Biography

Valeh Shamilov received his PhD degree in Technical Sciences in 1997. He is author of about 50 scientific works, including books, patents, monographs and articles. At present, he is Head of SOCAR's Department of Nanotechnology. He is an expert in the field of application of nanotechnologies for the oil extraction process aimed on the improving oil recovery. At present he the works on the application of nanotechnology in enhancing oil extraction as well as against many complications existing in oil industry (salt deposition, sand plugs, in drilling, etc.

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