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The Famenian reservoir limestones on core petrophysical and electron spin resonance data (Southern slope of South-Tatarian Arc)

Nurgalieva N., Khassanova N., Anikina E.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

This paper presents core data on the composition and reservoir properties of the Famenian carbonate rocks in typical well section on the southern slope of South-Tatarian Arc. The core data include structures, minerals, reservoir properties measurements from previous studies and geochemical signs, just received by method of electron spin resonance (ESR). Investigated intervals of 16 and 6 m thicknesses belong to the Famenian stage. The thickest interval is composed of grainstones and packstones. The second interval is composed of mainly packstones. The granulated fossils predominate in the studied limestones. Porous space is controlled by primary structure and also by leaching processes, secondary calcite mineralization and stylolites. The interval of 16 m concludes four layers on thin sections data and reservoir properties. The interval of 6 m belongs to one layer. ESR data have been obtained on 22 samples collected with step 0.6-1.2 m along the section. ESR spectra are characterized by narrow lines, pointing on marine genesis of carbonates. Paramagnetic centers of Mn2+ and SO2- have been observed as typical labels of rocks due by processes of carbonate sedimentation. A symbate behavior of Mn2+ and SO2- contents along the section correlates with reservoir characteristics increasing. A diverse behavior of Mn2+ and SO2- contents corresponds to reservoir characteristics decreasing. It can be explained by the unaltered carbonates in the first case and the altered carbonates in the second case because of the leaching, secondary crystallization, adding of the paramagnetic ions and redistribution of paramagnetic centers in new formed mineral phases.

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Keywords

Electron spin resonance (ESR) labels alternation, The Famenian oil saturated limestones

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