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# Experimental study on optimization of acidizing acidizing fluid in heterogeneous oolitic limestone reservoir

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The oolitic limestone reservoir of Qianjiang Formation in Jianghan Oilfield has the characteristics of shallow burial, thin layer, developed upper and lower water layers and strong heterogeneity, so it is difficult to be reformed on site. In order to optimize the transformation process and the optimal process parameters suitable for the reservoir, the core dissolution experiment and acid displacement experiment of two different acid systems of conventional acid and retarded acid were carried out in this paper. Combined with the analysis of CT scanning results, the action law of oolitic limestone and different acid systems, the quantitative characterization of permeability change at different injection rates and the CT three-dimensional imaging of acid etching pore characteristics were clarified; at the same time, according to the results of acid rock reaction kinetics experiment and acid etching conductivity experiment, the effective distance of acid rock reaction in different acid system is predicted theoretically, and the best acid system and injection parameters are optimized. The results showed that the optimum concentrations of hydrochloric acid and retarded acid were 20 % and 10 %, respectively. The displacement rate has no obvious difference in the increase of permeability after core acidification, but it has a great influence on the wormhole structure formed by acid etching. The increase of displacement rate will form wormholes with better connectivity and less damage to rock skeleton and physical properties; by calculating the experimental parameters of acid-rock reaction kinetics, it is found that the effective distance of retarded acid is 10 m longer than that of conventional acid under the same injection rate of large displacement acid. Finally, according to the characteristics of the reservoir, a large displacement injection of ‘ 10 % retarded acid + 0.3 % corrosion inhibitor ‘ acid system can effectively increase the acid action distance and enhance the transformation effect.

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