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Foam plugging performance and flow characteristics in fracture system

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Fractured-vuggy carbonate reservoirs are characterized by strong heterogeneity. In a multi-fracture system, compared with secondary fractures and matrix, the main fracture has stronger conductivity, and it is of great significance to investigate the fluid flow characteristics in the main fracture.

Based on this, combined with actual reservoir conditions, a fracture core model and a visualized slab fracture model were prepared. The plugging performance of the ordinary foam and the enhanced foam system in the fractured core model was compared. The flow characteristics of ordinary foam and enhanced foam system in the visualized slab fracture model was explored. The research results show that in the single fracture core model, as the fracture depth decreases, the plugging capability of the foam gradually increases, and the plugging capability of the enhanced foam is higher than that of the ordinary foam. In the parallel fracture core model, the flow regulation effect of ordinary foam flooding under the same fracture level difference is better, and the flow regulation effect of enhanced foam flooding under different fracture level difference is relatively stable. Under the condition of the same fracture depth, the lower the surface roughness, the smaller the shear and resistance effects of the corresponding foam flooding. Under the condition of the same surface roughness, the greater the fracture depth, the smaller the flow resistance of the foam. After the same foam system flows in the slab fracture model for the same time, the burst of foam is the lowest under the condition of high depth and low roughness, and the shear collapse of ordinary foam is larger than that of enhanced foam during the flow process. Combined with various factors, the migration and distribution characteristics of foam in the fracture system are summarized, in order to provide guidance for the application of foam in plugging performance and flow regulation in fractured carbonate reservoirs, so as to better realize the development of deep fractured-vuggy carbonate reservoirs.

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Primary authors: Dr XU, Zhengxiao (China University of Petroleum(East China)); Dr LI, Zhaomin (China University of Petroleum (East China)); Prof. LI, Binfei (China University of Petroleum (East China))

Co-authors: Mr ZHANG, Qifeng (China University of Petroleum (East China)); Mr ZHENG, Lei (China University of Petroleum (East China)); Mr SONG, Yongjin (China University of Petroleum (East China)); Mrs YU, Tong (Shanghai Police College)

Presenter: Dr XU, Zhengxiao (China University of Petroleum(East China))

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