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RESEARCH NOTES

微生物在圆柱孔中运移的模拟研究

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摘要 The mathematical model to characterize the transport of microorganisms in a finite-length cylindrical pore with the inside surface rich in microbial nutrients is developed, and the transport behavior of microorganisms in such a pore is discussed. Incorporated with key parameters such as microbial chemotaxis, diffusion, microbial propagation and water flooding, this model is focused on the concentration profile of microorganisms in both radial and axial directions in the cylindrical pore during microbial transport under these parameters. Prediction by simulation based on the model shows that higher concentration of microorganisms at and near the pore inside surface occurred during water flooding, and the radial concentration gradient in the cylindrical pore was consequently formed mainly due to microbial chemotaxis. Prediction also provides better understanding on the transport mechanism of microorganism in cylindrical pores, which is believed to be significant in the process of microbial enhanced oil recovery.

关键词 microorganisms, transport, cylindrical pore, chemotaxis,

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Characterization of microbial transport in cylindrical pores

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Abstract The mathematical model to characterize the transport of microorganisms in a finite-length cylindrical pore with the inside surface rich in microbial nutrients is developed, and the transport behavior of microorganisms in such a pore is discussed. Incorporated with key parameters such as microbial chemotaxis, diffusion, microbial propagation and water flooding, this model is focused on the concentration profile of microorganisms in both radial and axial directions in the cylindrical pore during microbial transport under these parameters. Prediction by simulation based on the model shows that higher concentration of microorganism at and near the pore inside surface occurred during water flooding, and the radial concentration gradient in the cylindrical pore was consequently formed mainly due to microbial chemotaxis. Prediction also provides better understanding on the transport mechanism of microorganism in cylindrical pores, which is believed to be significant in the process of microbial enhanced oil recovery.

Key words microorganisms, transport, cylindrical pore, chemotaxis,

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