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## The influence of fracture on the gas reservoir development by the seepage experiment

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There are two main roles for the fractures in the gas reservoir development. On the one hand, fractures will improve the permeability of the reservoir, and the gas recovery of the high permeability reservoir will be higher than that of the low permeability under the same abandonment gas production rate. On the other hand, the water will rush along the fractures and the gas-water two phases flow will occur in the gas reservoir, resulting in premature water production and low gas recovery. In this paper, the influence of fracture on the gas reservoir development is studied by the seepage experiment. Firstly, the influence of fracture on the permeability is studied by testing the physical properties of rock samples with fractures. And the fracture is characteristic with different fracture length, fracture width and fracture location. Secondly, influence of fracture on gas reservoir development is studied by gas and water flow in the fractured rock sample and mathematical simulation. The conclusions are that: (1) In the simple-phase flow, the penetrated fracture improved the rock sample permeability by over 10 times and the non-penetrated fracture improved the rock sample permeability by less than 2 times. (2) The two-phase flow physical simulation experiment shows that the water in the matrix rock is piston-type propulsion, and the propulsion speed is relatively slow. Water rushes in the fractures along the fractured core with a high speed. (3) The mathematical simulation shows that: when the permeability contrast which means the ratio of fracture permeability to matrix rock permeability reaches 20, the effect of water invasion on the gas recovery is significantly increased, thus the gas recovery will be declined dramatically.

### References

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