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Pore Scale Simulation of Oil Transport of Kerogen in Shale: Coupling Molecular Dynamics And N-S Equation

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Owing to huge proved reserves and successful application of stimulation technology such as fracturing, unconventional resources attract of worldwide attention. The study on fluid transportation in shale is rare for lack of powerful theory and models. Our paper focus on oil behavior in kerogen using methods combining MD simulation and NS equation. And an analytical mathematical model is derived to estimate the parameters: velocity. The results shows that micro-scale interface effect can't be neglected during reservoir simulation. The relationship between comparison factor and driving force gradient is positively related. And the magnitude of comparison factor is around 10^1. The relationship between comparison factor and pore radii is strong negatively related owing huge interface effect. And the relationship between permeable factor and driving force gradient and between permeable factor and pore radii they are both positively related. The slop of small driving force gradient is steeper than that of strong driving force gradient. And the relationship between permeable factor and pore radii resembles linear trend. The magnitude of permeable factor is around 10^(-16) m^(-2). The final result is constant with early studies and also supports our hypothesis.

References

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Primary authors: JIA, Cunqi; YAO, Jun (China University of Petroleum (East China))

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