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Investigation of two-phase flow in a new pore doublet model

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Pore-scale flow modeling based on pore network model is an efficient simulation method. However, the distribution of two-phase fluid in pores and throats is based on the two-phase numerical simulation results in a single channel during the simulation of two-phase flow. The influence of pore-throat topology and pore-throat ratio cannot be considered. Hence, a new pore doublet model is proposed, named pore-throat doublet model. Only two kinds of flow behaviors can be observed in conventional parallel dual-channel model: single-channel intrusion and dual-channel simultaneous intrusion. However, a new flow behavior, slug flow, was found in the simulation of two-phase flow in the new pore doublet model, which could not be observed in the conventional model. Finally, a series of researches on slug flow were carried out. The range of conditions for slug flow formation was obtained by considering different channel width ratio, Ca number and different pressure drop.

References

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