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Pore-scale Modeling and Numerical Simulation for Viscoelastic Emulsion Flow

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In this study, a body force driven two-phase fluid flow in porous media is numerically simulated by weakly compressible smoothed particle hydrodynamics, a Lagrangian mesh free particle method. The dispersed phase consists of viscoelastic emulsive droplets and is assumed to obey Oldroyd-B rheological model. The background phase is a Newtonian fluid. The interfacial tension between two phases and the wettability between fluids and solid boundaries are evaluated by pairwise force model. Different flow velocity, viscosity ratio and Weissenberg number are investigated. All simulations are implemented on GPU to achieve high efficiency.

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