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Jizhou Li* (jl48@rice.edu), Department of Computational and Applied Math, 6100 Main MS-134, Houston, TX 77005. *High order discontinuous Galerkin method for reservoir flow simulations.*

We present a high order discontinuous Galerkin method for miscible displacement simulation in porous media. The method uses weighted average stabilization technique and flux reconstruction post-processing. The mathematical model is decoupled and solved sequentially. We apply domain decomposition and algebraic multigrid preconditioner for the linear system resulting from the high order discretization. The accuracy and robustness of the method are demonstrated in the convergence study with analytical solutions and heterogeneous porous media respectively. We also investigate the effect of grid orientation and anisotropic permeability using high order discontinuous Galerkin method in contrast with cell-centered finite volume method. The study of the parallel implementation shows the scalability and efficiency of the method on parallel architecture. We also verify the simulation result on highly heterogeneous permeability field from the SPE10 model. (Received January 05, 2015)