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Shock Layer effects on Viscous Fingering instability CHINAR RANA, MANORANJAN MISHRA, Indian Institute of Technology Ropar, India — The displacement flow in a porous media is remarkably influenced by the solute concentration dissolved in the fluids. The equilibrium-dispersive model for the evolution of the solute is numerically investigated which is coupled to Darcy law. In this model the fluid viscosity depends upon the solute concentration with the solute undergoing a non-linear adsorption of Langmuir type. The non-linear adsorption results in the formation of shock layer, which is progressively developed at the interface of the two fluids. The simulation results reveal that as soon as there is viscosity contrast between the interplaying fluids, the steepened profile formed due to Langmuir adsorption speed up the instability phenomena. Thus for fluids having larger viscosity contrast the shock layer is never formed. However, for fluids having less viscosity gradient, the shock layer gets formed but it eventually vanishes at the onset of instability. Hence the viscous fingering instability and shock layer affect the occurrence of each other.

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