Transient numerical simulation of miscible channel flow with heat transfer and viscous heating[1] KIRTI SAHU, PRASHANT VALLURI, Imperial College London, HANG DING, University of California, Santa Barbara, OMAR MATAR, Imperial College London — Pressure-driven miscible channel flow undergoing heat transfer and viscous heating, focusing on the displacement of a highly viscous fluid by a less viscous one, is studied by direct numerical simulations using the finite volume method. The flow dynamics are governed by the continuity and Navier-Stokes equations, coupled to an energy equation and a convective- diffusion equation for the concentration of the more viscous fluid through a concentration- and temperature- dependent viscosity. The effect of temperature difference, Nahme, Prandtl, and Schmidt numbers on the propagation of the front separating the two fluids and temporal evolution of the mass of the less viscous fluid is examined.

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