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Self-organizing flow in a multi-component driven system - interacting lattice gas simulation RAS PANDEY, Naval Research Laboratory and University of Southern Mississippi, JOE GETTRUST, Naval Research Laboratory — We consider a mixture of mobile particles (A, B) described by their molecular weight, interaction, and miscibility gap on a discrete lattice of size $L_x \times L_y \times L_z$. The source of particles is at the bottom $(z = 1)$ of the lattice with open top $(z = L_z)$. The Metropolis algorithm is used for stochastic moves of particles with a hydrostatic pressure bias (H). Periodic boundary conditions are used along the transverse directions with open longitudinal ends. Particles continue to enter the lattice from the source and are driven by bias, concentration gradient, and thermal energy against gravity. Net flow of particles occurs and a steady-state is reached with a self-organized morphology. Self-organizing structures and flow flux rates are examined as a function of bias for a range of molecular weight ratios for non-equilibrium steady-state system with non-conservative mass/volume. Response of the flux density shows linear and non-linear behavior depending on the range of the bias with an eruptive response at extreme values of the bias.

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