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Parametric study on phase separation of binary mixtures in a lid driven cavity: A DPD study HARINADHA GIDITURI, VIJAY ANAND, MAHESH PANCHAGNULA, SRIKANTH VEDANTAM, Indian Inst of Tech-Madras — We investigate the phase separation behavior of binary mixtures in two dimensional periodic and lid driven cavity domains using dissipative particle dynamics (DPD). The effect of DPD parameters like repulsion coefficient, dissipative coefficient, cut-off radius, and weight function exponent on domain size growth has been studied. The phase separation is delayed for low values of repulsion coefficient. Under these conditions, a few clusters of the dispersed phase are distributed in a continuous phase. This is because of weak inter-particle repulsion. As we increase the repulsion coefficient value, this behavior disappears. The domain growth rate is also observed to increase with an increase in the value of the dissipation coefficient as well as cut-off radius. Finally, the dynamics of phase separation in the lid driven cavity problem are significantly different when compared to that in the periodic domain, due to the formation of a stable vortex in the cavity. The vortex results in a dynamic equilibrium between clustering and separation. The distribution of cluster sizes is studied as a function of the driven cavity parameters.

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