Diffusion in 2D ionic fluids

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The study of two-dimensional fluids goes back to the pioneering work of Alder and Wainwright from which various studies were carried out to describe the behavior of these systems. In this work we focus on the study of ionic fluids in two dimensions. We carried out a systematic study of the diffusion coefficient of multivalent ions as a function of temperature and density by means of molecular dynamics simulations. We found that the diffusion coefficient tends to increase when the temperature rises and decreases for high density due that the ions have less accessible space.
When the ions are multivalent the coefficient shows an oscillatory behavior at low temperatures, whose oscillations decrease in amplitude as the temperature and density increase, this seems to be directly related to the formation of clusters in the mixtures studied. We also analyzed the behaviour of the mean squared displacement and the velocity autocorrelation function to classify the diffusive motion in the mixtures here studied.