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Two-dimensional cooperative sequential adsorption with evaporation for ionic self-assembly of nanoparticles ERIC SCHWEN, VINCENT KIM, BRIAN SIMPSON, JONATHAN COOK, IRINA MAZILU, DAN MAZILU, Washington and Lee University — We present an analytical model for the process of ionic self-assembly of nanoparticles. This process is used for the creation of antireflective coatings and the analytical model for the particle density can be applied to predict the index of refraction. We created a cooperative sequential adsorption with evaporation model on a two-dimensional lattice in which particles are both deposited and evaporated from the surface and adsorption rates depend on the occupation of neighboring sites. By assuming translational invariance, we were able to solve for a self-consistent equation for the steady state coverage of the surface. Monte Carlo simulations show an excellent match between the analytical model and mean field solution. We related our model to the experimental results for varied colloidal suspension concentrations to determine the relationship between the parameters of our model and particle concentration.

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