Exact and Approximate Solutions for a Class of Cooperative Stochastic Models[1] REBECCA MELKERSON, GILLENHAAL BECK, ESTEVAN HALL-MEJIA, SABIN NSHIMYUMUKIZA, Washington and Lee University, CARLOS DA FONSECA, Kuwait University, DAN MAZILU, IRINA MAZILU, Washington and Lee University — We present a class of cooperative sequential adsorption models with evaporation defined on general lattice structures. Using matrix algebra theory to solve the associated master equations, we find the time-dependent probability distributions. We discuss these models in the context of ionic self-assembly of silica nanoparticles in order to also find the time-dependent surface coverage. To test the limits of the matrix theory, we add the possibilities for evaporation either once the surface is fully covered or at intermediate steps. We justify our mathematical models by comparing the results to customized experiments and computer simulations.

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