Abstract Submitted
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Competition between intermolecular and substrate interactions in a multicomponent lattice gas model[1] QIANG LIU, University of Maryland at College Park, JOHN WEEKS, University of Maryland, E.D.WILLIAMS'S GROUP, J.REUTT-ROBEY'S GROUP TEAM — Recent experiments have shown that acridine-9-carboxylic acid (ACA) molecules form a dense phase consisting of chain-like structures on Ag(111) with alternating orientations along the chain direction that permit the formation of strong hydrogen bonds. Despite the anisotropy in intermolecular interactions that leads to chain formation, molecular boundaries along and normal to the chair direction have very similar thermodynamic properties and fluctuations. We introduce a multicomponent lattice gas model where molecules with different orientations are treated as different species with different intermolecular interactions as well as different interactions with the substrate. This a generalization of the familiar Blume-Emery-Griffiths model of a binary lattice gas but in a region of parameter space not usually explored. We argue that the novel domain shapes, boundary fluctuations and phase densities seen in experiment arise from a competition between favorable anisotropic pair interactions in the chain phase and less favorable substrate interactions due to the different orientations. Detailed results of Monte Carlo simulations of this model and analytic work using mean field and pair approximation theories will be presented.

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