Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Charged binary fluid confined to cylindrical monolayer: Pattern formation YURY VELICHKO, MONICA OLVERA DE LA CRUZ, Northwestern University — Stoichiometric mixtures of acidic and basic peptide–amphiphile molecules (PA) composed of a hydrophobic block and a peptide block that favors β-sheet formation with a charged end–group co-assemble in the water solution at physiological pH–conditions into long cylindrical nanofibers. These fibers form a network that resembles extracellular matrix found in living tissue. PA–molecules self–aggregate because of competition between hydrophobic–hydrophilic interactions and stabilize aggregate structures by forming hydrogen bonds between peptide blocks and surface charges. On the other hand, small chemical distinction between cationic and anionic components may cause local segregation and formation of patterns. We investigate the phase behavior of stoichiometric charged two-component fluid confined to cylindrical monolayer to describe pattern formation on the surface of self–assembled cylindrical aggregates, such as peptide amphiphiles. The net incompatibility among different components results in appearance of segregated domains which growth is inhibited by electrostatics. We find that the transition from isotropic to striped phase begins from the formation of small domains and proceeds through an intermediate state governed by defects. Detailed results of study of heat capacity, static structure factor, susceptibility and cluster asphericity parameter independence on the radius of the cylinder and degree of incompatibility we will present during the talk.

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Date submitted: 07 Dec 2004 Electronic form version 1.4