

Physical Chemistry Seminar

Tuesday,
November 3, 2009

11:00 a.m.

Room 1315
Chemistry Building

Equilibrium-Surface Freezing of Liquids



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Surface freezing (SF), the formation of a one or two molecular layers thick crystalline film on the surface of a melt, occurs in long-chain hydrocarbons such as n-alkanes and alcohols over a range of temperature where the bulk remains molten. Several theoretical models have been proposed to explain this behavior; one of the leading contenders is that the methyl end-group of these chain molecules acts as a surfactant. In this case, the surface energy is minimized when the number of these groups is maximized at the interface. This high packing density promotes an all-trans configuration of the chains and a surface normal molecular orientation, leading to a crystalline (frozen) ordering of the surface layer. At the vapor interface of a liquid this reversible SF phenomena represents a very simple and elegant example of self-assembly. More recently related phenomenon has also been observed at solid interfaces and at surfactant covered surfaces of water. I will provide an overview of surface freezing in a variety of systems in this talk. Work at Brookhaven National Laboratory is supported by US Department of Energy, Divisions of Chemical and Materials Science, under the contract no. DE-AC0298CH10886. In collaboration with M. Deutsch, E. Sloutskin, S. Yefet, Z. Sapir & L. Tamam (Bar Ilan); D. Pontoni, H. Reichert, V. Honkimäki (ESRF); C. D. Bain, Q. Lei, K.M. & Wilkinson (Durham Univ.)

Refreshments will be available prior to the seminar at 10:45 a.m. outside room 1315

Graduate Students may meet with the speaker at 1:15 p.m. in Room 8305f