482g Submonolayer Coverage of Long Chain Alkanes at Sio2/Air Interfaces: Molecular Mobility and Aggregation Behavior

Hans Riegler and Ralf Koehler

For low surface coverages, above their melting point, long chain alkanes (e.g. C30H62) form completely closed wetting films at SiO2/air interfaces. Below the melting point, the alkanes aggregate into domains with the molecules oriented upright in all-trans configuration (typical length: 4nm). It is found that for submonolayer coverage (= liquid film thickness is less than the all-trans molecular length) the melting (solidification) temperature depends on the surface coverage. Thinner films have significantly lower solidification temperatures. Thus, below the solidification point, there is an equilibrium coexistence between the solid domains and a molecularly thin film in between. Temperature changes lead to redistribution of the solid/liquid partitioning, i.e., a lateral alkane flow. We present on-line optical microscopy observations (!) of the domain growth and the alkane flow. The lateral flow distances (distance between domains) are typically in the range of several microns, the film thicknesses in the range of nm. It is shown that the flow depends on the film thickness and that the mobility seems to increase for thinner films (<1nm).