Abstract

This thesis deals with the studies on assembly and organization of amphiphilic molecules at air-water and air-solid interfaces. Molecules consisting of hydrophilic and hydropho- bic parts are known as amphiphilic molecules or amphiphiles. These molecules when spread at air-water interface, the hydrophilic part anchors to the water and the hy- drophobic part stays away from the water. If there is a proper balance between the hydrophilic and hydrophobic parts, these molecules form insoluble monolayer at air- water interface called Langmuir monolayer. Langmuir monolayer can be used as a model system to study the properties of two dimensional systems. Langmuir monolayers can be transferred from the air-water interface onto the solid substrates by Langmuir-Blodgett (LB) technique to obtain LB films. These films can be studied using techniques like atomic force microscope (AFM). Different modes of AFM can be used to study the topography, electrical and mechanical properties of the LB films. The scope of this thesis is as follows: The first chapter of the thesis gives a brief introduction to liquid crystals (LCs), their different types based on structure and properties. Then it continues with a short introduction to Langmuir monolayers and Langmuir Blodgett thin films. The second chapter deals with the self-organization of LC mesogen at air-water and air-solid interface. Recently azobenzene based novel mesogen has been synthesised in our laboratory, which has been used to form Langmuir Monolayers and LB thin films. Temperature dependent AFM studies have been carried out. The third chapter deals with study of CdSe quantum dots - discotic LCs composites at air-water and air-solid interfaces. LC Nanoscience has a lot of potential applications in many devices such as solar cells, biosensors, etc. Thus, our efforts to study thin films of such composites might be useful in such thin film devices. The fourth and final chapter concludes the work and mentions about the future work that will be carried out.