FT-RAIRS STUDIES ON HYDROGEN-BONDING IN SELF-ASSEMBLED MONOLAYERS AND MULTILAYERS ON GOLD SUBSTRATES

YANPING CAO, DANIEL DYER, and LICHANG WANG, *Department of Chemistry and Biochemistry, Southern Illinois University, Carbondale, IL 62901* ; QINGFENG GE, *Department of Chemical Engineering, University of Virginia, Charlottesville, VA 22904*.

Studies of the strength and direction of hydrogen-bonding networks in self-assembled monolayers and multilayers are critical for the design of new materials, such as liquid crystals. We have been focused on finding materials which will produce directional hydrogen-bonding networks, especially interlayer hydrogen-bonding. In this talk, we will present the results from our studies on the monolayers of mixed MHA (16-mercapto hexadecanoic acid) with methyl terminated thiols of different molecular chain lengths and also on the bilayers with OCA (octoxyl cinnamic acid) as the second layer. Fourier Transform Reflection-Absorption Infrared Spectroscopy (FT-RAIRS), Ellipsometry, contact angle measurement, and the density functional theory calculations are used in our work. It is found that a much stronger interlayer hydrogen-bonding exists in bilayers with a mixed monolayer than that with a pure carboxylic acid terminated monolayer. The prospects of utilizing these directional hydrogen-bonding interactions in supramolecular engineering will be discussed.