5th TcSUH STUDENT/POSTDOC SEMINAR

February 25, 2019 (Monday) 5:30 p.m., HSC 102

Vietnamese Sandwiches and soft drinks will be served!!

RSVP required for sandwich: tcsuhstudents@uh.edu

Probing the influence of surface dipoles on the structure of contacting liquids with sum frequency generation spectroscopy

Daniela Deleon

TcSUH and Department of Chemistry

Abstract: Interactions at the solid-liquid interface have a large impact on the macroscale wetting properties of thin films. Surface-specific sum frequency generation (SFG) spectroscopy, one of a limited number of techniques having the capability to probe such interfaces, generates a surface vibrational spectrum that is sensitive to molecular structure and can be used to determine the orientation of molecules at the interface. This presentation highlights the use of SFG spectroscopy to study the interaction between liquid acetonitrile and selectively fluorinated self-assembled monolayer (FSAM) interfaces generated by the adsorption of $CF_3(CH_2)_nSH$ (n = 16 and 17) and $CD_3(CF_2)_6(CH_2)_{10}SH$ on gold. The C–N and C–H stretching regions, 2000–2300 cm^{-1} and 2800–3050 cm^{-1}, respectively, were used to probe the solid-liquid interface of the FSAMs in contact with acetonitrile. The appearance of positive- or negative-pointing peaks in the SFG spectrum of acetonitrile as a function of the variation in the terminal group of the FSAMs could be attributed, to a first-order approximation, to the presence of dipoles at the top of the films. Thus, the orientation (up or down) of the acetonitrile peaks were ascribed to changes in the FSAM dipole direction. Coherent molecular spectroscopy was used as a direct probe of this effect by examining the differences in the SFG spectra to determine the relative orientation of acetonitrile with respect to the underlying SAM and, therefore, provided evidence for the dipole-influenced wettability behavior of these unique surfaces.

Bio: Daniela Deleon is a Ph.D. student in Dr. T. Randall Lee and Dr. Steve Baldelli groups in the chemistry department.

Fully rubbery integrated electronics from high effective mobility intrinsically stretchable semiconductors

Dr. Kyoseung Sim

TcSUH and Department of Mechanical Engineering

Abstract: High mobility intrinsically stretchable semiconductor is substantially important to realize high-performance stretchable electronics and integrated devices for various applications involving large mechanical deformation. Here, we report fully rubbery integrated electronics based on high effective mobility intrinsically stretchable semiconductor, obtained by introducing metallic carbon nanotube into the stretchable semiconductor composite, which is enabled by providing fast lane for the short carrier transport distance. The field effect transistors, and their array based on all intrinsically stretchable electronics materials were successfully developed, which retained normal operation without substantial degradation under mechanical strain of 50 %. Fully rubbery integrated electronics and logic gate were demonstrated, and they also normally functioned upon mechanical stretching. A rubbery active matrix based elastic tactile sensing skin to map physical touch was demonstrated as one of the further applications.

Bio: Dr. Kyoseung Sim is currently a postdoc in Dr. Cunjiang Yu's group in the Department of Mechanical Engineering and Texas Center for Superconductivity at University of Houston.

Persons with disabilities who require accommodations to attend this seminar should call 713-743-8213.