THE UNIVERSITY OF HONG KONG

DEPARTMENT OF MECHANICAL ENGINEERING

SEMINAR

Online

Title: **Monolayer flexible field effect transistor patterned by 2D mica dry lithography**

Speaker: **Mr. Zou Deng (PhD candidate)**
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The University of Hong Kong
Hong Kong

Date: **26 April, 2022 (Tuesday)**

Time: **2:00 p.m. (Hong Kong Time)**

Zoom meeting:

1) **Link to join the meeting:**

https://hku.zoom.us/j/98281916340?pwd=L0NJME1ZTlJuWnZMaC9aUGE1MGZ2dz09

2) **Meeting ID: 982 8191 6340**

3) **Password: 139079**

Abstract:
Organic field-effect transistors (OFETs) based on two-dimensional (2D) monolayer organic semiconductor (OSC) have demonstrated promising potential for various applications, such as light emitting diode (LED) drivers, logic circuits, and wearable electrocardiography (ECG) sensor. To date, the fabrications of this class of highly crystallized 2D organic semiconductors (OSC) are dominated by solution shearing. As these organic active layers are only a few molecular layer thick, their compatibility with conventional evaporated top electrodes and downsizing by photolithography are still the major bottlenecks of their development. In this talk, I will discuss a damage-free electrode transfer stamp with a chemical-free semiconductor patterning stamp to fabricate OFETs over a large area. These 2,9-didecyldinaphtho[2,3-b:2′,3′-f]thieno[3,2-b]thiophene (C_{10}-DNTT) monolayer OFETs can retain the decent performance properties with a low threshold voltage (V_{TH}) for less than 0.5 V, a low subthreshold swing (*SS*) of 140 mV dec^{-1}, and intrinsic mobility of around 10 cm^2 V^{-1} S^{-1}. The proposed patterning approach is also utilized to develop flexible OFET array on parylene (2 μm) substrate, and shows high uniformity and conformability. The proposed electrode transfer and patterning stamps have addressed the long-lasting compatibility problem of depositing electrodes onto monolayer OSC and the OSC patterning. It opens a new path to further reduce the fabrication cost and simply the manufacturing process of OFET arrays for the more advanced electronic or biomedical applications.

ALL INTERESTED ARE WELCOME
For further information, please contact Dr. P.K.L. Chan at 3917 2634.

Research area: Advanced Materials