הטכניון - מכון טכנולוגי לישראל

TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY

הפקולטה להנדסה כימית
ע"ש וולפסון
The Wolfson Department of Chemical Engineering

Wolfson Department of Chemical Engineering Special Seminar
Lecture Hall 6, Wolfson Department of Chemical Engineering,
Monday August 6th at 1:30 pm

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M.Sc. Student (Advisor: Prof. Hossam Haick)
Chemical Engineering, Technion

TIME-RESOLVED DECOUPLING OF MULTIPLE STIMULI USING FLEXIBLE FABRIC SENSOR WITH UNIQUE SELF-RECOVERY

Wearable electronics are nowadays leading revolution in people's daily life. Despite of the progress on multiple factors detection, improved sensitivity and wider application, multifunctional sensors suffer the problem of indistinguishable readout signals to various stimuli, while single variable sensing devices were ripped out their versatility. Therefore, it is significant to develop ways to decouple the stimuli for multifunctional devices.
We propose to locate our sensors' function in between the rigorous sensitivity and insensitivity through the introduction of time scale. Namely, the unidentified readout at specific time point can be recognized their various patterns with time passing by, to provide more informative signals for decoupling.
Our method is to endow the self-recovery function to the fabric based chemi-resistor by covering the cellulosic backbones with well dispersed 1D carbon nanotubes (CNT) and 0D modified gold nano particles (AuNPs) as conductive sensing groups in elastomer SEBS. It was discovered that good elasticity of SEBS and supporting fabric backbones joined force to promote the reconstruction of the conductive path during mechanical stimulation. Moreover, volatile organic compounds (VOCs) were detected within range of 100 ppb to 10 ppm based on the porous structure of fabric and pre-concentration of SEBS. In total, three models were employed to simulate these bending-releasing, pressure-releasing and exposure-vacuum cleaning process, where these models are incompatible to be used for other stimulation, which enables decoupling and quantitative analysis via unique sensor's self-recovery function in time scale

Refreshments will be served at 1:15pm