



Wolfson Department of Chemical Engineering Seminar

Wednesday, May 20th, 2026 at 18:00 (China Time)/13:00 (Israel Time)

Zoom link: <https://gtiit.zoom.us/j/96016781685>

Conformal, Substrate-Free Liquid Metal Electrode for Continuous Health Monitoring

Wenqing Yan

MSc Seminar

GTIIT Advisor: Prof. Yan Wang

Technion Advisor: Prof. Hossam Haick

Department of Chemical Engineering, Technion-Israel Institute for Technology

Abstract:

Thin, skin-conformal soft electronics are ideal for seamless integration with the skin, enabling high-fidelity health monitoring and advanced human-machine interactions. However, achieving imperceptible and seamless adhesion with traditional materials and design approaches remains challenging, as it is difficult to simultaneously meet the requirements of gas permeability, high conductivity, and conformability. In this work, we present a straightforward and efficient design for ultrathin, substrate-free, highly gas-permeable, and conductive liquid metal electrodes. These electrodes can be directly laminated onto human skin using water mist dissolution, facilitated by electrospun nanomeshes made from a polyvinyl alcohol and sodium dodecyl sulfate substrate. The electrodes have a thickness of 8.3 micrometers, a conductivity of $4.2 \times 10^6 \text{ S m}^{-1}$, and a gas permeability of $1283.8 \pm 27.7 \text{ g m}^{-2} \text{ day}^{-1}$. A 24-hour skin patch test demonstrated that the epidermal electrodes did not cause any skin irritation. Additionally, the electrodes exhibit excellent customizable patterning capabilities and recyclability. The electrodes successfully measure high-fidelity electrophysiological signals wirelessly, even during various daily activities such as sleep, desktop work, and walking.