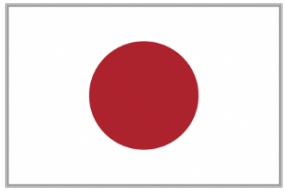


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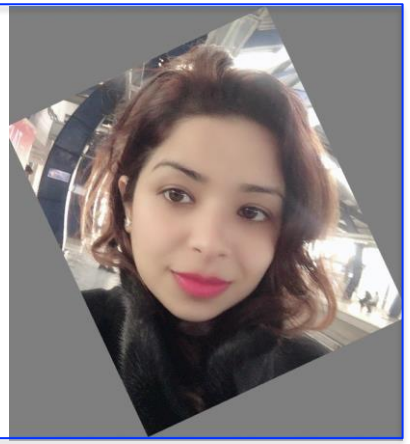
SERIES 73

Dr. Preety Ahuja

Series - 73

Date & Time : May 11, 2022 (15:30 - 16:30 JST | 12:00 – 13:00 IST)
Venue : Zoom
Speaker : Dr. Preety Ahuja
Affiliation : Research Initiative for Supra-Materials,
Shinshu University, Nagano, Japan
E-mail : drpreetyahuja@gmail.com



Title-Futuristic Health Status from clinical to non-clinal settings

The outbreak of coronavirus disease (COVID-19) has led to health care systems being overwhelmed by the progressive emergence of new cases with respiratory failure. For efficient monitoring, clinicians must pay attention to the consequent decrease in carbon dioxide (CO_2) levels. However, existing invasive CO_2 monitoring methods are painful and risky while noninvasive methods are inadequate owing to their rigidity, insubstantial gas permeability, high operating temperature, and frequent calibration. The commercialized CO_2 sensor (TOSCA monitor) has been widely used for measuring transcutaneous CO_2 to prognose the respiratory status of patients. It must be strongly attached to the ear and maintain at 42 ^oC, causing discomfort to the patients in the long run. A highly sensitive and time-resolved skin CO_2 sensor at ambient temperature is intensively required for efficient monitoring.

Prompted by this, a cost-effective approach for fabricating stretchable and breathable on-skin CO_2 sensing device has been developed. Silicone elastomer sponges impregnated with secondary amine wrapped carbon nanotube (SWCNT) is used as the sensing matrix. It offers highly selective CO_2 sensing response (detection limit of 70 ppb) and excellent respirability, making it compatible with the skin-sensor interface. Additionally, it displays a stable and reliable response under large tensile strain of 60%, proposing new insight towards unobstructed tracking of skin CO_2 gas to assess respiratory deterioration. Further, the practicability and strong correlation in the data observed by commercialized device endow reliable skin CO2 measurement device for upcoming wearable and stretchable electronics.