

Printed Stretchable Electronic and Microfluidic Systems for Wearable Biomedical Applications

ASRULNIZAM ABD MANAF

Collaborative Microelectronic Design Excellence Center (CEDEC),
Universiti Sains Malaysia
Pulau Pinang, Malaysia

ABSTRACT

Digital healthcare monitoring has spurred increasing interest in wearable electrochemical biosensors due to simplify of sensing mechanism. Compared with the traditionally rigid and bulky electrochemical biosensors, flexible and stretchable devices render a unique capability to conform to the complex, hierarchically textured surfaces of the human body. With an identifying the suitable bioreceptor which selectively react with the target analyte, wearable electrochemical biosensors can convert the types and concentrations of chemical changes in the body into redox current signal. An exploration of wearable electrochemical biosensors integrates printed electrodes ink on textile and flexible thin-film substrate materials. A stretchable property is needed for the thin-film device to form an intimate contact with the textured skin surface and to deform with various natural skin motions. Thus, stretchable materials and structures have been exploited to ensure the effective function of a wearable electrochemical biosensor. In this research, we focused on implementation of carbon based ink as working electrode on stretchable substrate toward to sweat analysis and physiological monitoring by integrating with micro fluidic system. The challenging and fabrication method of printable electronic will be discuss on this presentation.

BRIEF BIOGRAPHY

Dr. Asrulnizam Bin Abd Manaf (SM'18) is associate professor and deputy director at Collaborative Microelectronic Design Excellence Center (CEDEC), Universiti Sains Malaysia. He is a leader of the CMOS based sensing interface integrated circuitry, microfluidic based-MEMS/NEMS and printable-based devices technology group at CEDEC. He received Ph.D in Engineering from School of Fundamental Science and Technology, Keio University Japan in 2009. He has authored and co-authored 60 international technical journal or conference papers and hold 1 patent on pocket size DNA reader. His research interest has been in the areas of microfluidic based devices, CMOS sensing interface integrated circuitry, heterogenous integration, micro 3-dimension grayscale technology, MEMS/NEMS fabrication technology, printable electronics, and wearable electronics. He received IETE J C Bose Memorial Award (2017) for the best engineering oriented paper. He is also senior member of IEEE.