

Sensing Devices Based on Nanomaterials for Wearable and Smart Electronics

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Abstract

For wearable and smart electronics, developments of various sensing devices including physical, chemical and biological sensors are essentially required for monitoring of human or environment around human. For various applications such as smart health or other applications in the future, highly sensitive sensors with new functionalities such as flexibility, stretchability and/or optical transparency are to be integrated in various platforms including wearable band, skin-attachable patch, mobile or portable systems. In this presentation, we demonstrate ultrasensitive flexible, stretchable and/or transparent physical (strain, pressure, temperature, IR, UV and visible light), chemical (gases, ions) and biological (protein, DNA, enzyme and small molecule) sensing devices based on low-dimensional nanoscale materials (0D, 1D and 2D), nanocomposites and their hierarchical nanohybrids in FET or resistor structure. Also, some demonstrations of patchable integrated platforms with multiple sensors or sensor-energy harvester-energy storage for monitoring of physiological parameters, emotional expressions, bodily motions, and daily activities of human are presented.

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