Stretchable RF Antenna Sensors for Conformal Strain Detection

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Recently, wearable sensor systems for bio-medical applications such as human activity recognition or monitoring, biomedical clothing, and point-of-care medical devices have been tremendously spotlighted. This kind of wearable system should be attachable, flexible, or stretchable, skin-conformable, lightweight, comfortable and non-invasive for the user. Especially, mechanically stretchable wearable sensors for biomedical applications have been emerging to have extracorporeal sensing capability such as motion and strain detection. These sensors have been developed to help disabled people in need and athletes in game. For example, applications are found in real-time monitoring of athletes in play to protect them from severe damages and improve them in performance. Various types of highly conductive stretchable strain sensors have been demonstrated for applications such as human motion detection and tactile sensing.

To achieve mobile monitoring of this purpose, wireless communication such as the RFID is essential. A system consisting of both mechanical sensors and RF antenna tags can be considered so that the mechanical strain is changed into electrical signals by the sensor and the electrical signals are transmitted to the reader by the RF antenna tag simultaneously. However, this system is bulky for the attachable application to the body and it may restrict motion of the athletes. On the other hand, a stretchable RF antenna tag can perform both roles as the sensor and the antenna. Thus, a stretchable RF antenna tag can sense the mechanical strain and at the same time transmit the information wirelessly.

In this presentation, we present facile fabrication of stretchable RF antenna sensor applications and strain monitoring system using stretching conductors with silver nanowire and silver nanoparticle inks to achieve manufacturing-available strain sensing systems.

[References]

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