Hybrid flexible NFC sensor on paper

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In the last 10 years, different research fields have focused their attention on the development of everyday healthcare objects, such as bandages, sanitary napkins or patches that can be made "intelligent", becoming capable of monitoring human biomedical parameters (i.e., humidity, pH, glucose levels), with the additional advantage of being environmentally friendly [1]. Here, a wearable sensor based on an hybrid technology and environmentally friendly processes, able to address the needs for future circular economy, as well as those for cheap, flexible and lightweight, multi-functional electronics is presented. The hybrid demonstrator concept is illustrated in Figure 1a and consists of a silicon NFC transponder chip with logic and transceiver capabilities, bonded on a printed circuit board on paper with printed components, such as an antenna, a resistive sensor, a photovoltaic module (the power supply), and interconnects. The reader is a common smartphone with NFC capabilities, with a reading range of few cms. A graphene-based ink was employed for the development of a strain and pH sensor (Figure 1b) whilst poly(3,4-ethylenedioxythiophene)-poly(styrenesulfonate) (PEDOT:PSS)-based ink for a humidity detector.

References

[1] L. Wang, K. Jiang, G. Shen, Appl. Phys. Lett., 119 (2021) 150501

Figures

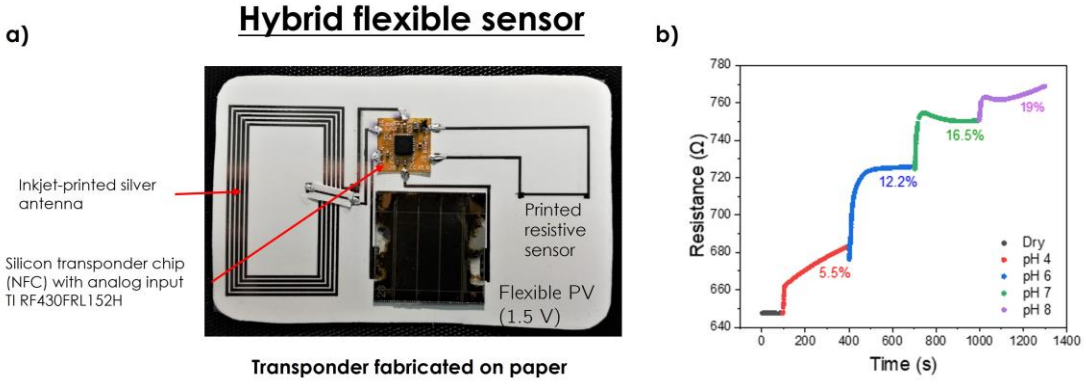

Figure 1: a, optical image of the NFC sensor transponder and **b,** real time response of the pH sensor.