



## **FLEXIBLE PH SENSOR WITH POLYANILINE LAYER BASED ON IMPEDANCE MEASUREMENT**

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*Abstract- A flexible sensor with conducting polyaniline layer for detecting pH value based on the impedance measurement is fabricated and demonstrated in this study. The pH sensor consists of an interdigital electrode array on a flexible printed circuit and a thin-film polyaniline as the sensing layer. As the conductivity of polyaniline depends on the redox state, the impedance change of the polyaniline after it has reacted with different pH value solutions works as the sensing mechanism. In order to obtain a reliable and stable impedance measurement result, a standard procedure for pH value detection is also developed. As the experimental results show, the impedance variation of the pH sensor is less than 1% in an ambient environment, and the measured impedance increases with pH values varying from 2 to 12. In addition, the impedance change between the unreacted sensor and the reacted sensor exhibit 3 orders of difference; thus, the resolution of the pH value detection is very high, making it possible to detect the impedance by means of a simple electronic device. Consequently, the low-cost, disposable, flexible IDT electrode sensor with a polyaniline layer effectively demonstrates the feasibility of pH value detection. Moreover, the sensor can be applied to other applications, such as gas detection, humidity and glucose, etc.*

**Index terms:** Flexible; Polyaniline; pH value; Impedance