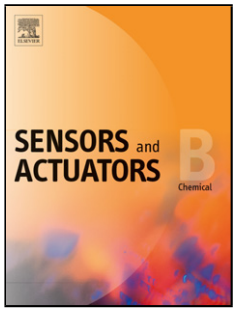

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Laser-enabled fabrication of flexible and transparent pH sensor with Near-Field Communication for in-situ monitoring of wound infection

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Highlights

- The device consists of a flexible and disposable pH sensor that is interfaced with a custom-designed NFC tag.
- Fabrication process uses low-cost materials and simple laser processing
- The sensor has a sensitivity of −55 mV/pH with optical transparency for visual inspection.

Abstract

The pH of the wound milieu can provide valuable information regarding wound condition as related to early diagnosis of infection. Existing devices for measurement of wound pH are often expensive with readout systems that require trained personnel, making them impractical for clinical or home usage. This work reports on the development of a low-cost smartphone-based pH sensing platform that consists of a disposable, flexible, and transparent pH sensor interfaced with a custom-designed flexible, battery-less, and reusable near-field communication tag. The fabrication of the disposable potentiometric pH sensor, combines low-cost screen-printing with electro-polymerization of polyaniline on transparent electrodes that are fabricated by direct laser scribing of indium tin oxide (ITO) films. The sensors have a high sensitivity of −55 mV/pH within the physiologically relevant range of pH 4–10, with optical transparency to enable visual inspection of the underlying tissue. The sensor was