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## Wearable device for pH monitoring in wounds

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The use of wearable and noninvasive miniaturized devices for continuously monitoring health parameters has the potential to revolutionize the treatment of chronic diseases. In particular, chronic wounds need a constant monitoring and their treatment is really expensive for healthcare providers. However, a smart bandage able to protect the wound and to give information about some indicator of infection, such as pH, is still missing. In this context, we present the development and the characterization of a novel wearable all-polymeric device for pH monitoring during wound healing. The layout of the device is based on the presence of three micro-electrodes made of poly(3,4-thylenedioxythiophene) (PEDOT), a conductive polymer used to its high conductivity and transparency, on a flexible cyclic olefin copolymer foil. The fabrication strategy is based on a high throughput and low cost soft embossing process which couples the efficiency of hot embossing with the use of a cheap soft working stamp. The soft embossing process has been characterized finding the best parameters that allow the pattern to be transfer from the soft working stamp (made of a commercial dimethacrylate polymer) to the substrate till a minimum dimension of 1 $\mu$ m. Moreover, the properties of PEDOT electrodes have been tuned in order to increase the conductivity and decrease the solubility in water by means of a treatment with ethylene glycol (EG). Finally, pH sensitive layer made of polyaniline (PANI) has been electropolymerized on the working electrode. Results on pH detection demonstrate the potential of this device for wound healing monitoring.

### Biography

Paola Fanzio has completed her PhD in 2012 from the Italian Institute of Technology, Genova Italy. She is currently working as a Post-doc at TU Delft (the Netherlands) under the supervision of Dr. Luigi Sasso. She has published 15 papers in peer review journals and authored two patents.

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