Fraunhofer ISIT

FLEXIBLE ELECTRONICS IN SPORTS – ELECTRONIC LACTATE ANALYSIS –

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INTRODUCTION

Flexible electronics combined with standard electronics and silicon technology allow the manufacturing of wearable smart sensor devices for measuring various bio-signals. Together with wireless data transfer to a smartphone a biofeedback suited for private as well as for medical use becomes possible.

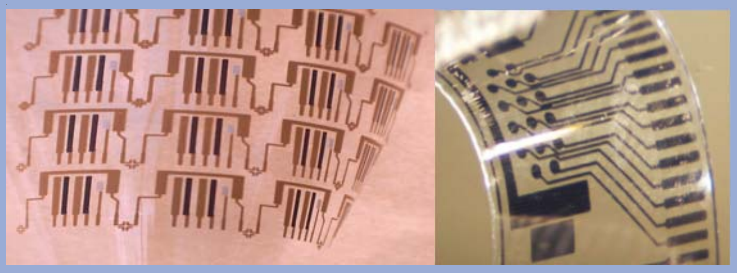
ELECTRONIC LACTATE ANALYSIS

- Non-invasive electrochemical (amperometric) lactate analysis in human sweat on human skin, for example by a patch or a wristband
- Applications will be in competitive and leisure sports, e.g. for training control and protection against sporting overload
- The flexible lactate sensor with electronics, bluetooth antenna, battery and fluidic system will be assembled on a flex substrate
- Biofeedback: Online / offline data transfer to a smartphone / PC per bluetooth
- Sweat and blood lactate values correlated (up to now controversially discussed in literature)

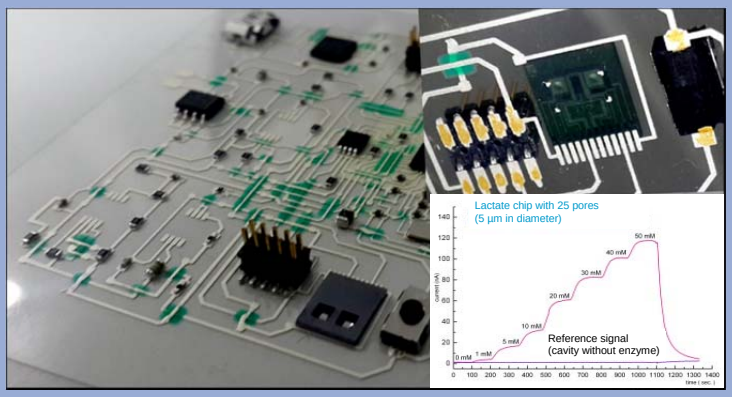
PROTOTYPE DEVELOPMENT

- Both flexible lactate sensors and hybrid flexible boards have been developed and manufactured.
- Function of the flexible sensor with printed metallic screen printed (Ag/AgCl, Au, C) or etched (Au) electrodes has been shown.

FIRST RESULTS



Flexible Lactate sensor on PET foil: Reference and working electrodes have been screen printed (Ag/AgCl, Au, C) or etched (Au)



Flexible PET board for lactate data analysis with an assembled silicon lactate chip (insets: bottom view of lactate chip; test measurement). It will be replaced by the flexible Lactate sensor.

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