

Accepted Manuscript

Title: Toward wearable patch for sweat analysis

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PII: S0925-4005(16)30144-7

DOI: <http://dx.doi.org/doi:10.1016/j.snb.2016.01.143>

Reference: SNB 19654

To appear in: *Sensors and Actuators B*

Received date: 1-12-2015

Revised date: 26-1-2016

Accepted date: 29-1-2016



Please cite this article as: V.A.T.Dam, M.A.G.Zevenbergen, R.van Schaijk, Toward wearable patch for sweat analysis, *Sensors and Actuators B: Chemical* <http://dx.doi.org/10.1016/j.snb.2016.01.143>

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Toward wearable patch for sweat analysis

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Highlights

- Flexible wearable electrochemical sensing platform for continuously monitoring of chloride ions in sweat is presented.
- Highly sensitive chloride patch is fabricated by using low cost techniques: drop casting and screen printing.
- Real-time monitoring of the chloride concentration in sweat of a test subject during treadmill exercise is demonstrated.

Abstract

This work presents an inexpensive and disposable miniaturized electrochemical sensing platform, which was fabricated on a polyethylene terephthalate substrate for continuously monitoring the ion composition of sweat. The sweat patch consisted of an area for sweat collection, integrated reference electrode and an array of screen printed AgCl electrodes for real-time monitoring chloride concentration in sweat. The printing process and thickness of the AgCl electrodes were optimized to enhance the stability of the electrode in fluid. The AgCl electrodes were stable for more than a week in fluid and had a chloride sensitivity of 58 mV per decade. The reference electrode was successfully fabricated on the same patch by adding a polyhydroxyethylmethacrylate hydrogel layer on top of one of the AgCl electrode in the array and followed by conditioning in 3 M KCl solution. The patch, which was worn on the chest of a test subject, was able to continuously

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