Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information

Figure S1. Contact angle measurements.

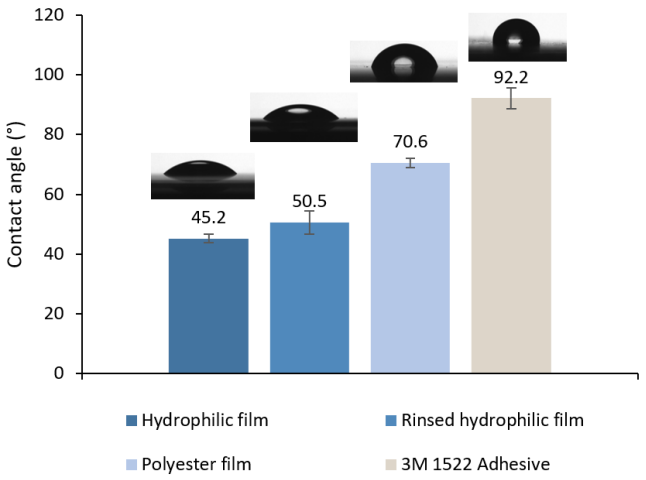


Figure S2: Measured power output (moving average) and heart rhythm over time during the final cycling experiment.

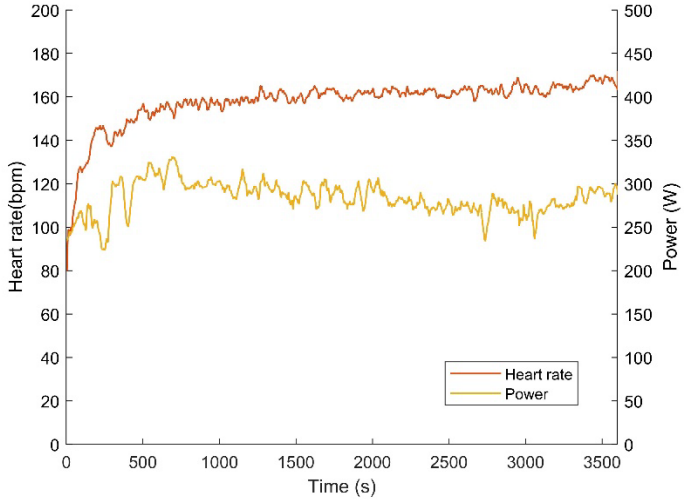
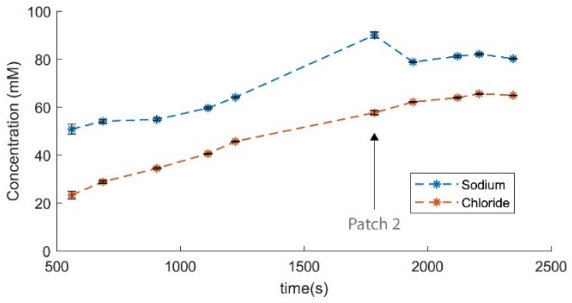
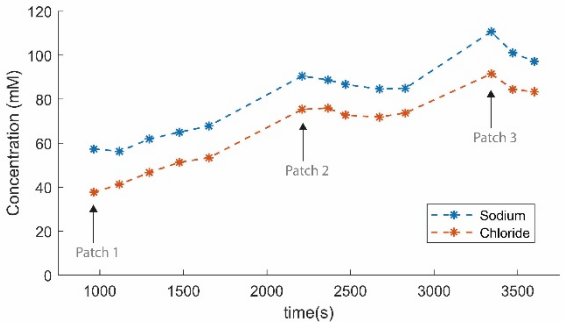


Figure S3: Results from the 1st tests: (a) Experiment 1: Na^+ and Cl^- measurements show an elevation in Na^+ concentration in the first reservoir of a new patch (arrow). (b) Experiment 2: Na^+ and Cl^- measurements both are elevated when a new patch starts to be filled.

(a)



(b)



To illustrate the importance of a strict and optimized protocol for sweat collection and analysis two graphs of these first two tests area shown in the figure.

Graph a) in figure S3 shows very sudden peaks in Na^+ concentrations when a new patch was placed, but Cl^- concentrations are not elevated. It was expected that this Na^+ elevation is the result of a surfactant that was placed on the foil to make it more hydrophilic.

In the next experiments, the foils were rinsed with demineralized water to eliminate this source of contamination. To ensure that the contaminants were eliminated, new foil and cleaned foil were placed in vials with 3 ml of water for 24 h. In the new foil 10 ppm of Na^+ was found and in the cleaned foil the Na^+ was hardly present.

Graph b) in figure S3 is from a consecutive experiment when the surfactants were removed. In this graph is seen that both, Na^+ and Cl^- levels are still increased in the first reservoirs of a patch. In this experiment the skin was wiped with a dry gauze pad, before placing patch 2 and 3. It is expected that this resulted in accumulation of salts at the skin.

As an improvement, the skin was cleaned with a sterile gauze pad with demineralized water two times before placing a new patch. After this improvement, the peaks were gone. Results of the final experiment are shown in the paper.

Figure S4. Visualization of the steps to transfer the samples to vials

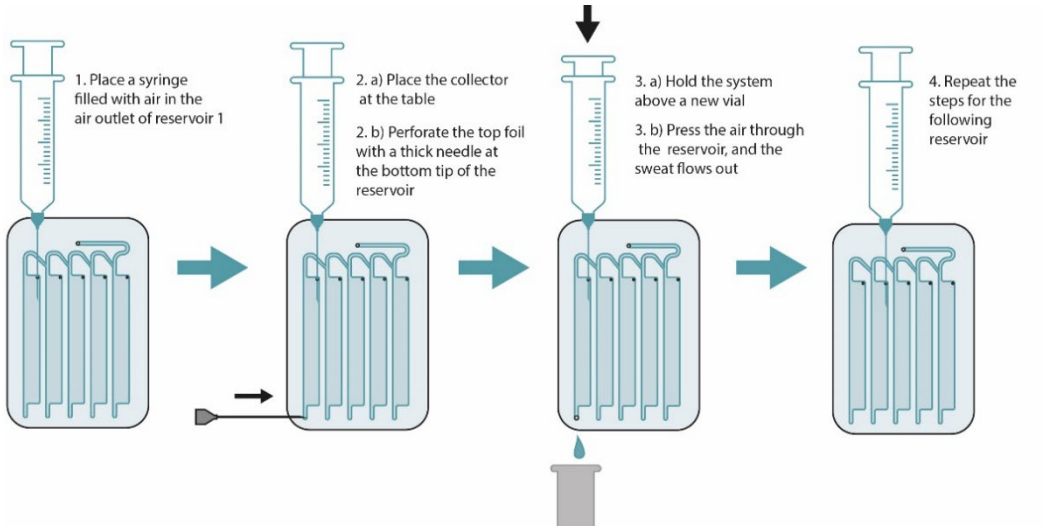
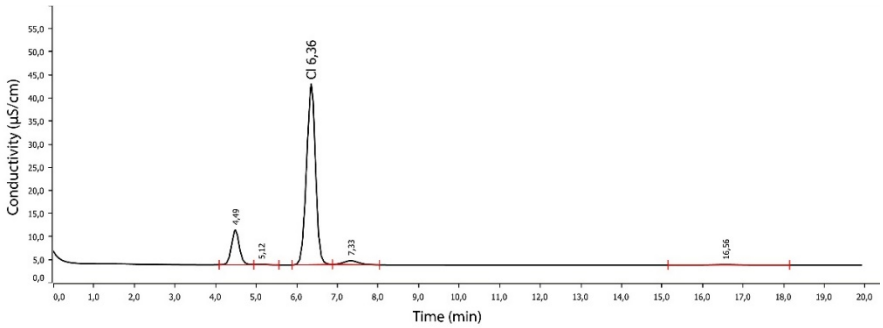


Figure S5. Chromatographs of the anions (a) and the cations (b)

(a)



(b)