

Technology Development Group

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A Wearable Freestanding Electrochemical Sensing System

Tech ID: 31996 / UC Case 2020-189-0

SUMMARY

Researchers in the UCLA Department of Electrical and Computer Engineering have developed a strategy for high-fidelity, wearable biomarker data acquisition and sensor integration with consumer electronics.

BACKGROUND

Wearable consumer electronics are designed to harvest physiologically relevant data and have gained popularity in personal health monitoring. To gain insight into a body's dynamic chemistry, measurements need to be made via biofluids, such as sweat. Existing non-invasive sweatanalyzing systems, however, rely on in-plane interconnections and rigid connectors, forcing them to detect biomarkers through highly strained (motion-induced) regions. This limits data fidelity and makes the device highly susceptible to failure (due to delamination, slipping, detachment, etc.) and external interference (e.g., mechanical noise). There is a need for improved, flexible strain-isolated sweat sampling for wearable devices that maintains high data fidelity.

INNOVATION

UCLA researchers have developed a disposable freestanding electrochemical sensing system (FESS) for strain-isolated sweat analysis that can be easily integrated with future wearable consumer electronics while preserving biomarker data fidelity. The FESS can be simultaneously adhered to skin and electronics with the aid of double-sided adhesion forces without the need for rigid connectors, allowing for efficient biomarker information delivery despite movement. The FESS was able to be seamlessly integrated into a smartwatch and provide robust biomarker readouts throughout the user's various activities, demonstrating the ease in which it can be integrated with consumer electronics.

APPLICATIONS

- Wearable device
- Data fidelity control
- Sweat analysis
- Early diagnosis instrument

ADVANTAGES

- Easily integrated into wearable devices
- Strain-isolated sensor
- Small size
- Versatile can target a wide panel of biomarkers

STATE OF DEVELOPMENT

A product prototype FESS-enabled smartwatch was developed featuring sweat sampling, electrochemical sensing, and data

display/transmission, all within a self-contained wearable platform.

PATENT STATUS

Country	Туре	Number	Dated	Case
European Patent Office	Published Application	4034684	08/03/2022	2020-189

CONTACT

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INVENTORS

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OTHER INFORMATION

KEYWORDS

freestanding sensor, strain isolated

sensor, sweat analysis, wearable

device, wearable electronics,

smartwatch, biomarker data fidelity

CATEGORIZED AS

Biotechnology

Health

- Medical
 - Devices
 - Diagnostics

Sensors & Instrumentation

- Biosensors
- Medical

RELATED CASES

2020-189-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ► Wearable Voltammetric Monitoring of Electroactive Drugs
- Mediator-Free Electroenzymatic Sensing with Enhanced Sensitivity and Selectivity for Wearable Metabolite and Nutrient Monitoring Applications
- Multiplexed Sweat Extraction And Sensing Wearable Interface For Normalized And Periodic Analysis
- ► A 3D Microfluidic Actuation and Sensing Wearable Technology for In-Situ Biofluid Processing and Analysis
- A Wearable Platform for In-Situ Analysis of Hormones
- ▶ Ultra-Low Cost, Transferrable and Thermally Stable Sensor Array Patterned on Conductive Substrate for Biofluid Analysis
- In-Situ Sweat Rate Monitoring For Normalization Of Sweat Analyte Concentrations

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