

A Self-Powered Wearable Flexible Sensor Based on the Conductive Polymer PEDOT:PSS Hydrogel That can Monitor Lactic Acid Concentration in Human Sweat Using a Smartphone



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Lactate in human sweat can serve as a marker for various conditions in the body. Elevated levels of lactate in sweat can indicate the intensity of exercise or physical activity. In this study, we developed a smart-phone-enabled, self-powered wearable flexible sensor based on the conductive polymer PEDOT:PSS hydrogel, capable of monitoring lactate in sweat in real time, eliminating the need for invasive blood sampling. By using the conductive polymer hydrogel as the substrate, the internal resistance of the sensor was greatly reduced, and the current signal was nearly 10 times higher than that of the traditional electrolytic cell system. The linear range of detection is from 10nM to 50mM, and the detection limit is up to 4.38nM. After the sensor was connected to the smartphone via Bluetooth, the error of the result obtained by processing the signal using the APP on the smartphone was no more than 6%. This work provides a new idea for the use of wearable electrochemical sensors in human health monitoring.

Biography:

I obtained my MA degree from Shanghai Normal University in 2022 and I am currently pursuing a PhD at Hong Kong Metropolitan University. My research focuses on electrochemical biosensors. I have a keen interest in interdisciplinary fields that intersect microbiology, materials science, and electrochemistry.