

PRINTED ALL-ORGANIC REFLECTANCE OXIMETER ARRAY

Tech ID: 29091 / UC Case 2018-083-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,963,764	04/23/2024	2018-083

BRIEF DESCRIPTION

A flexible reflectance oximeter array (ROA) composed of printed organic light-emitting diodes (OLEDs) and organic photodiodes (OPDs), which senses reflected light from tissue to determine the oxygen saturation. Since reflected light is used as the signal, the sensor array can be used beyond the conventional sensing locations. We implemented the ROA to measure SpO₂ on the forehead with 1.1% mean error and to create two-dimensional (2D) oxygenation maps of the adult forearm under pressure cuff-induced ischemia. Due to the mechanical flexibility, 2D oxygenation mapping capability, and the ability to place the sensor in diverse places, the ROA is promising for novel medical sensing applications such as mapping oxygenation in tissues, wounds, or transplanted organs.

SUGGESTED USES

The ROA can be used for:

- » continuous oxygenation monitoring for fitness applications
- » medical diagnostic purposes, such as oxygenation monitoring of patients suffering from pulmonary diseases (e.g., Chronic Obstructive Pulmonary Disease, Interstitial Lung Disease)
- » monitor patients suffering from sleep disorders or undergoing pulmonary rehabilitation

The 2D oxygenation mapping is also promising for novel medical sensing applications such as mapping oxygenation in tissues, wounds, or transplanted organs. One example is monitoring the stage of Scleroderma, a chronic connective tissue disease.

ADVANTAGES

Since reflected light is used as the signal, the sensor array can be used beyond the conventional sensing locations. In comparison, the optical method for determining oxygen saturation SpO₂ in blood, called transmission-mode pulse oximetry, is limited only to tissues that can be transilluminated, such as the earlobes and the fingers.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Biodegradable Potentiometric Sensor to Measure Ion Concentration in Soil](#)
- ▶ [Scalable And High-Performance Pressure Sensors For Wearable Electronics](#)
- ▶ [Pulse Oximeter Using Ambient Light](#)

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OTHER INFORMATION

KEYWORDS

pulse oximetry, reflectance oximetry, medical devices

CATEGORIZED AS

- » **Biotechnology**
- » Bioinformatics
- » Health
- » **Materials & Chemicals**
- » Biological
- » **Medical**
- » Devices
- » Diagnostics
- » **Sensors & Instrumentation**
- » Biosensors
- » Medical

RELATED CASES

2018-083-0

- ▶ A Potentiometric Mechanical Sensor
- ▶ Simultaneous Doctor Blading Of Different Colored Organic Light Emitting Diodes
- ▶ Organic Multi-Channel Optoelectronic Sensors For Smart Wristbands
- ▶ Printed Organic Leds And Photodetector For A Flexible Reflectance Measurement-Based Blood Oximeter



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