Integrated Soft Optoelectronics for Wearable Health Monitoring

Tech ID: 31997 / UC Case 2020-712-0

BACKGROUND

Conventional electronic devices based on flexible or rigid printed circuit boards (PCBs) cannot conform to curved surfaces or stretch to accommodate new requirements of disruptive technologies. Additionally, existing methods for the production of stretchable electronics are unable to produce devices with high integration densities achievable with conventional methods. These methods also rely on processes that cannot be implemented at scale. Overcoming these limitations would enable practical applications of stretchable electronic devices for health monitoring, wearable computing, medical devices, and beyond.

DESCRIPTION

Researchers at the University of California, Santa Barbara have developed new methods for the design and fabrication of stretchable electronic devices that can achieve high integration densities, similar to those that can be achieved using conventional PCBs. This technology produces complex stretchable electronic devices based on a wide variety of thin polymer substrates. Strain relief geometries and features allow these stretchable devices to integrate widely used surface mount devices (SMDs) in complex circuits that may be miniaturized. The process provides sufficient control over geometry to enable the use of automation tools including optical registration and robotic components assembly. This technique is compatible with existing industrial manufacturing processes, making it a scalable solution for manufacturing stretchable electronics. Early demonstrations of this technology have delivered high signal-to-noise ratio physiological measurements of peripheral hemodynamics, confirming its suitability for health monitoring applications, but many other applications are possible.

ADVANTAGES

- Increased integration density, enabling complex circuits
- Conformable to curved, soft, or shape-changing surfaces, including body tissues
- Compatible with existing manufacturing methods

APPLICATIONS

- Medical devices
- Wearable health-monitoring devices
- Wearable computing
- Implantable devices

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OTHER INFORMATION

KEYWORDS

soft electronics, wearable monitor, optoelectronics, sensor, biosensor, SMDs

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Medical**
  - Devices
- **Sensors & Instrumentation**
  - Biosensors
  - Medical

RELATED CASES

2020-712-0

- Wearable sensors
- Optoelectronic, pressure, force, or tactile sensors
- Stretchable displays

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20230155090	05/18/2023	2020-712

RELATED MATERIALS

- Integrated Soft Optoelectronics for Wearable Health Monitoring - 06/21/2020

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Photonic Devices For Converting Light Energy Into Mechanical Energy, Forces, and Displacements
- Highly Stretchable & Flexible Electronic Sensors

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