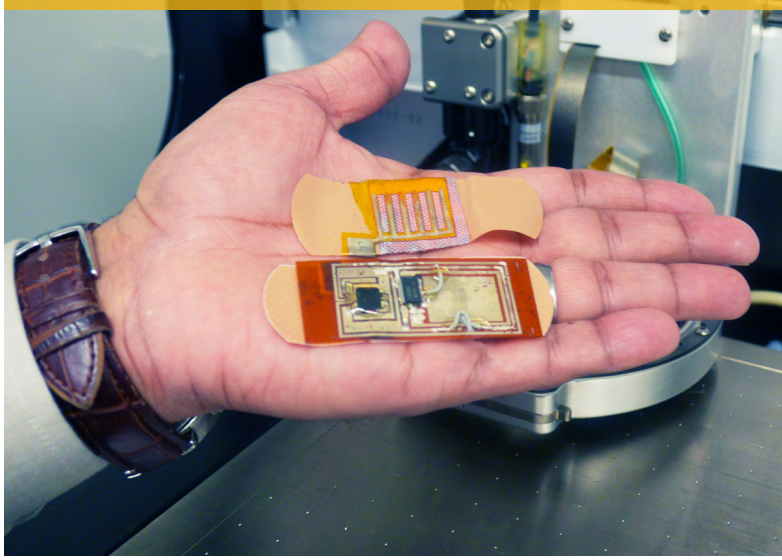
جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

TECHNOLOGY OPPORTUNITY

Smart Bandage for Real-Time Wireless Monitoring of Chronic Wounds

Smart bandage with reusable electronics for real-time wireless monitoring of wound pH, pressure and bleeding



Data shows that chronic wounds present a significant challenge to modern health care providers as they affect more than nine million people in the United States and Europe. Chronic wounds are wounds that do not follow normal healing processes and timelines. They bleed randomly and show variations in pH levels as a result of infection. External pressure can also cause these wounds to become chronic.

Diagnosis and treatment of chronic wounds is challenging and medical staff often rely on physical inspections of the wound in order to provide treatment. This method requires frequent trips to the hospital that are time consuming and expensive.

This technology solves the problem of wound monitoring by offering a low-cost wearable smart bandage that wirelessly detects early signs of wound infection such as bleeding and pH variations and can measure external pressure on the wound. This simple bandage strip can remotely send wound progression data and issue early warnings to patients, as well as remote medical staff, regarding the need to change the dressing.

Benefits

- Reduces healthcare costs for patients, hospitals and insurance providers
- Detects infections in a timely manner
- Better wound management
- Reusable electronics can be used on multiple disposable bandages
- Pressure sensors can alert patients and help them avoid pressure ulcers
- Provides dressing alerts for patients
- Hassle free wireless and real-time monitoring

Applications

- Consumer healthcare
- Hospitals and long-term remote health care
- Bed sore management

Opportunity

This technology is part of KAUST's technology commercialization program that seeks to stimulate development and commercial use of KAUST-developed technologies.

Opportunities exist for joint development, patent licensing, or other mutually beneficial relationships.

For More Information

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Technology Details

The proposed invention comprises two parts. The first part contains a disposable bandage with inkjet-printed sensors. The second part consists of a reusable electronic sensor.

The first part is developed using commercially-available bandage strips. A carbon-based sensor electrode is printed on office paper and attached to the bottom side of the bandage. The reusable electronic sensor is developed using inkjet printing on adhesive kapton tape.

The sensor circuit board, as well as the antenna and top sensor electrode, is inkjet printed on the tape. A double-sided circuit board is made on two sides of the tape. In order to connect both sides electronically, laser etching is used.

How It Works

The smart bandage is part disposable and part reusable. The sensors used to detect bleeding, pH levels and external pressure on the wound are located on a disposable bandage whereas the electronics on the flexible kapton tape can be detached and reused multiple times. The capacitive sensor detects bleeding, as well as pressure levels on the wound. A resistive sensor detects pH levels on the wound. The changes in capacitance and resistance are processed by the electronics, and the information is sent in a wireless fashion.

The wireless communication is done through an inkjet-printed loop antenna that is integrated with the circuit. This data can then be sent to remote health care providers using either the mobile network or the internet.

Why It Is Better

There are currently no commercially available wireless devices to continuously monitor the wound-healing process. The proposed smart bandage, for the first time, provides a complete wearable system to wirelessly monitor chronic wounds in real-time.

IP Protection

KAUST has a patent pending for this technology.

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