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Roll-to-Roll Production of Smart Wound Dressings for Real-Time and Retrospective Monitoring

Scalable wound dressings with integrated pH, temp, and moisture sensors for real-time infection monitoring.

Researchers at Purdue University have developed a method to integrate colorimetric sensors into traditional wound dressings, leading to improved patient outcomes and streamlined care for both clinical and at-home use. Traditional wound care relies on passive dressings with manual inspections or lab analyses, while advanced options like hydrocolloid dressings or electronic sensors focus only on single parameters, such as moisture or temperature. These solutions, often expensive and limited in scalability, fail to address comprehensive monitoring needs. In contrast, the innovative smart dressings developed at Purdue enable real-time and retrospective monitoring of diverse wound conditions such as pH, temperature, and moisture levels, providing valuable insights for wound management. The scalable roll-to-roll production method is compatible with various commercially available fabric substrates, ensuring an adaptable, cost-effective solution for diverse medical and personal care applications.

Technology Validation:

In situ testing on a 14-day mouse wound model demonstrated the technology's ability to detect early signs of infection. The biocompatibility of the smart wound dressing was evaluated with a cell viability assay showing cell viability that remained above 80% throughout.

Advantages:

-Real-time and retrospective monitoring capabilities

-Indicate wound condition through measurements of pH, temperature, and moisture

-Compatible with various fabric substrates

Technology ID
2025-LEE-71004

Category
Digital Health & Medtech/Remote Patient Monitoring & Telehealth
Digital Health & Medtech/Wearable Health Tech & Biosensors

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-Adaptable for medical and personal care uses

-Affordable

-User-friendly

-Enhance wound healing outcomes

-Reduced need for manual inspections

Applications:

Wound healing and monitoring in clinical and personal care settings.

TRL: 4

Intellectual Property:

Provisional-Patent, 2025-01-31, United States

Keywords: Biotechnology, Clinical Wound Management, Colorimetric Sensors, High-Throughput Manufacturing, Medical/Health, Point-of-Care Diagnostics, Real-Time Wound Monitoring, Retrospective Wound Analysis, Roll-to-Roll (R2R) Production, Scalable Medical Devices, Smart Wound Dressings