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INTRODUCTION

Wearable health monitoring devices due to the variety of qualities that they offer have become the prime focus in modern health care. These bioelectronic devices are flexible, skin conforming, portable, durable, highly sensitive, and can provide real-time monitoring.
They have proved to be highly useful in numerous cases such as patients going through the rehabilitation process, in the evaluation of the post-surgery performance of athletes, translation of sign language for individuals with inability to hear, early diagnosis and prognosis of certain illnesses such as Parkinson disease and also in sports performance and human-machine interfaces for robotics[1]. The strain sensors can also be widely applied in sports performance and human-machine interfaces for robotics. Flexible wearable sensors are the key point for monitoring motion and physiological signals and daily activity. The current studies on flexible and stretchable strain sensors have hardly succeeded to cover the important characteristics of the next generation of wearable electronics for rehabilitations[2]. These features involve low cost, high sensitivity, high elasticity, self-healing capability, and multi-functionality. Personalized cheap and accurate wearable electronics for human motion monitoring can help patients and doctors for rehabilitation.

EXPERIMENTAL METHODS

Here a sensitive, self-healable, and elastic strain sensor is developed by embedding nanomaterials along with a conductive polymer, PEDOT PSS. The sensors are sensitive to strain, pressure, and temperature and can achieve high stretchability up to 600% and great durability due to the self-healing properties.

RESULTS AND DISCUSSION

The electrical properties, sensitivity, and mechanical properties of the materials were tested at different strains. The conductivity of the materials goes up to 10^-3 S/cm while showing sensitivity to different temperatures between 15°C to 60°C based on the mechanical test. It can heal itself more than 95% in less than 3min. Sensitivity to pressure was measured too and it shows significant changes in conductivity when a wide range of pressures from 1KPa to 1MPa was applied to the sensor.

CONCLUSION

In this study, we developed a low cost and accurate and self-healable sensor for healthcare monitoring. We expanded the functionality of the material to also monitoring temperature of the body. This sensing material was also highly durable because of self-healing properties.

REFERENCES

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