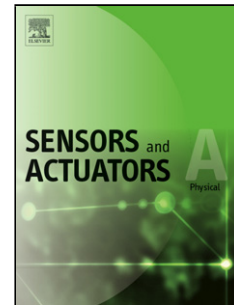


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# Human Motion Monitoring in Sports Using Wearable Graphene-Coated Fiber Sensors

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## Highlights

- We have fabricated a wearable graphene-coated fiber sensor at an inexpensive cost and a simple process.
- 2. The graphene-coated fiber not only has multiple functions in terms of stretching, bending, and torsion but also shows excellent performance in terms of a combination of high sensitivity, a broad sensing range and a high reproducibility.
- 3. We attached the wearable fiber sensors to several joints of the human body, including the shoulder, elbow, wrist, knee, and ankle, to monitor the basic movements of the human body. By processing and analyzing the raw data, these motions can be identified and analyzed.
- 4. We captured the typical action of soccer and basketball. Applying the fiber sensor, we achieved the accurate monitoring of the motions of the athlete's multiple joints. Furthermore, based on the raw data obtained from the sensors in various positions, the motion types could be accurately identified, and the athlete's motions could be improved. We also achieved accurate monitoring and identification of the nuances shown in the same joint movement by different athletes.

**Abstract:** Human motion monitoring is significant for professional athletes who desire to improve their performance in sports. In this study, we have fabricated a wearable graphene-coated fiber sensor and achieved the monitoring of the key motions during playing basketball and soccer. Most of body movements even the subtle ones, could be accurately identified by the sensor. The recorded sensing data indicated the ultrahigh sensitivity and a very wide sensing range. The high reproducibility and fast response ability demonstrated during the measurements shows that the as-fabricated sensors have the great potentials in the applications of sports motion monitoring.

**Keywords:** graphene-coated fiber, wearable sensor, human motion, sports, sensitivity.

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