

Graphene-based electrospun sensor for low strain sensing applications

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Abstract

The rapid progress in advanced functional materials has greatly influenced the development of sensing technologies for structural health monitoring (SHM), enabling the emergence of intelligent and responsive structures. Graphene-based sensors offer notable advantages, including high strain sensitivity, excellent flexibility, and the ability to monitor multiple physical parameters. This study investigates the fabrication and performance of conductive graphene ink films designed for low-strain sensing. The conductive films are fabricated using the electrospinning technique, and their morphology, electrical behaviour, and gauge factor were evaluated. The influence of different strain rates on sensor performance was also examined. Across all conditions, the gauge factor was found to range between 10.2 and 11.3. Furthermore, cyclic bending tests confirmed the consistency and reliability of the sensors, showing minimal signal drift and stable gauge factor values under repeated loading. The findings demonstrate that graphene ink films provide a lightweight, energy-efficient, and non-intrusive solution for low-strain monitoring, with strong potential for applications in SHM and wearable electronics.

References

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Figures

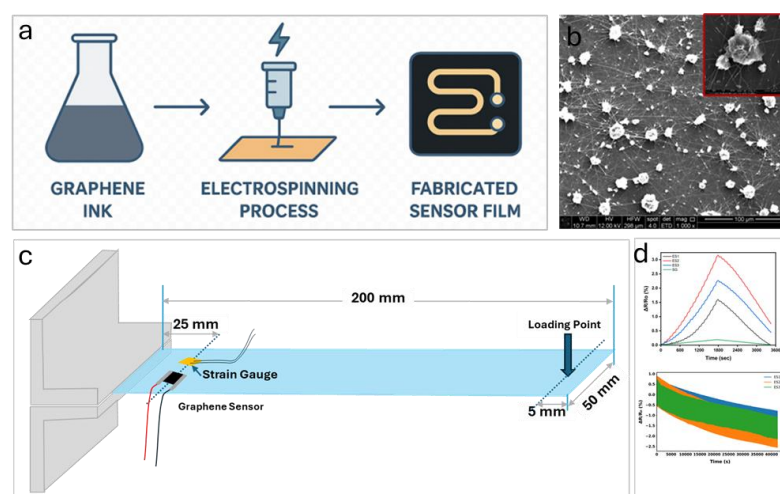


Figure 1: (a) Electrospun conductive film fabrication process, (b) Surface morphology (SEM), (c) Experimental process, (d) Electromechanical test results.