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Graphene paper for applications in flexible electronics

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Abstract

Thanks to its excellent mechanical, electrical and chemical properties, graphene is a promising material as a conductive flexible platform for new sustainable, flexible devices in many application fields, like wearable electronics, automotive and aeronautics, sensors, domotics, IoT and more [1-2]. Graphene Related Materials can be also reassembled in free-standing foils by mechanical compression, obtaining a flexible, electrically conductive, paper-like material called "graphene paper", which features a high electrical conductivity ($1x10^5$ S/m) and a mechanical stability even after a hundred of thousands bending times [1]. In this work, we report the advantage of using graphene paper for the realization of flexible heaters, NFC antennas, sensors and conductive tracks. The devices developed were prepared with easy, scalable and sustainable processes avoiding high temperatures annealing, chemical etching, pollutants and other high-energy consuming processes typical of metals. Further, graphene paper has a high compatibility with many substrates like textile, paper, plastic or composites, on which can be laminated with good adhesion widening the possible applications.

References

[1] A.C. Ferrari et al., Nanoscale 7 (2015), 4598
[2] F. Valorosi et al., Composites Science and Technology 185 (2020), 107848
[3] A. Scidà et al., Materials Today 21 (2018), 223

Figures

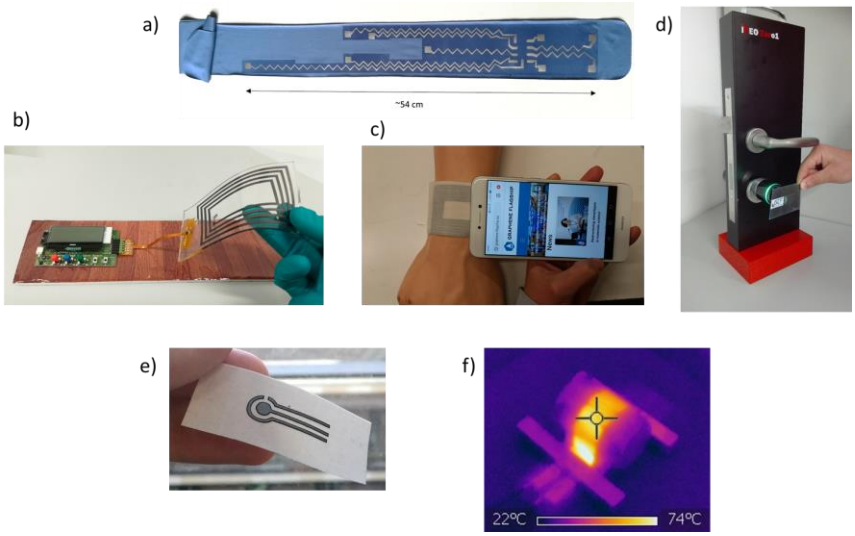

Figure 1: Prototypes developed with graphene paper for flexible electronics (conductive tracks, NFC antenna, electronic key, sensors, heaters).