

# Graphene-coated textile fibres: a platform for wearable devices

**Ana I. S. Neves**

Elias Torres Alonso

Gopika Rajan

Hugo Joulie

Saverio Russo

Monica F. Craciun

University of Exeter, Harrison Building, North Park Road, EX4 4QF, Exeter, United Kingdom

[a.neves@exeter.ac.uk](mailto:a.neves@exeter.ac.uk)

## Abstract

The concept of smart textiles is witnessing a rapid development with recent advances in nanotechnology and materials engineering. Bearing in mind that the concept of textiles is much wider than clothes and garments, the potential is immense. While most current commercial applications rely on conventional hardware simply mounted onto fibres of fabrics, a new approach to e-textiles consisting in using functionalised textiles for several technological applications has the potential to change the paradigm of wearable electronics completely.

Conducting fibres are an important component of any e-textile, not only because they can be used as wiring for simple textile-based electronic devices, but also because they can be used to build electronic devices directly on fibres. We have reported a new method to coat insulating textile fibres with graphene to make them conductive while preserving their appearance.<sup>1</sup> This versatile method can be used for fibres with different materials, shapes and sizes, as well as with different types of graphene.<sup>2</sup>

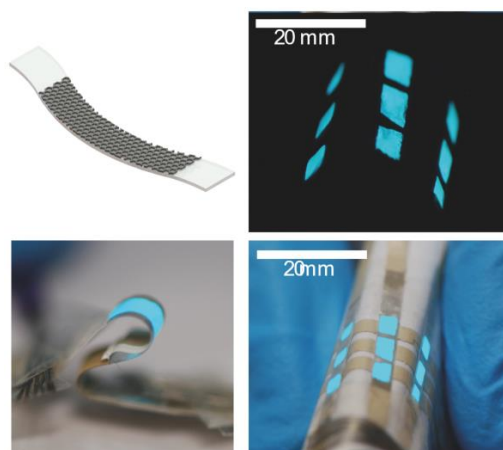
The first applications of electronic devices built on such fibres are demonstration, with an example of an alternating current electroluminescent (ACEL) device,<sup>3,4</sup> a touch and position sensor.<sup>4</sup> This opens up the way

for the realisation of wearable devices on textiles. Some results of the same platform used for sensing applications is also shown.

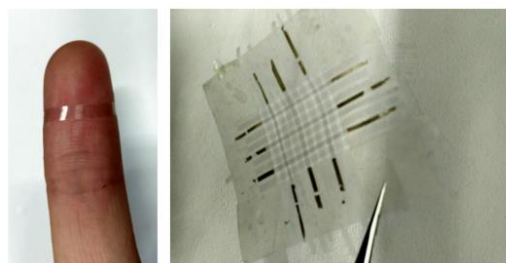
## References

- [1] A. I. S. Neves et al., *Sci. Rep.*, 5 (2015) 9866
- [2] A. I. S. Neves et al., *Sci. Rep.*, 7 (2017) 4250
- [3] E. Torres Alonso et al., *ACS Appl. Mater. Interf.*, 8 (2016) 16541
- [4] E. Torres Alonso et al., *Under Publication* (2018)

## Figures



**Figure 1:** Graphene-coated textile fibre and photos of EL fibre and arrays.



**Figure 2:** Touch and position sensors.