

# Graphene based supercapacitors : results perspectives and potential industrial implementation

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## Abstract

This contribution we will deal with the results recently obtained on supercapacitors with electrodes fabricated using mixtures of graphene based nanomaterials with carbon nanofibers and nanotubes [1]. The electrode fabrication has been performed using a new dynamic spray-gun based deposition process set-up at Thales Research and Technology (patented) [2]. This technique constitute a real breakthrough compared to the classical filtration method because electrodes can be deposited over large areas in a completely automated way, using different kinds of substrates and with a thickness between some nm and up to hundredth of  $\mu\text{m}$  [3]. During the presentation we will show the industrial implementation and value chain that has been identified to achieve real industrial devices.

## References

- [1] High-power graphene-carbon nanotube hybrid supercapacitors, .Ansaldo, A., Bondavalli, P., Bellani, S., Del Rio Castillo, A. E., Prato, M., Pellegrini, V., Pognon, G. and Bonaccorso, F. (2017), ChemNanoMat.
- [2] FR2976118 (A1), Method for manufacturing collector-electrode assembly that is utilized in supercapacitor, involves forming collector and electrode by spraying suspension comprising nano/microparticles, P. Bondavalli, P; Legagneux, L. Gorintin, P. Ponard 2012-12-07
- [3] Supercapacitor electrode based on mixtures of graphite and carbon nanotubes deposited using a new dynamic air-brush deposition technique, P Bondavalli, C.Delfaure, P.Legagneux, D.Pribat JECS 160 (4) A1-A6, 2013

## Figures

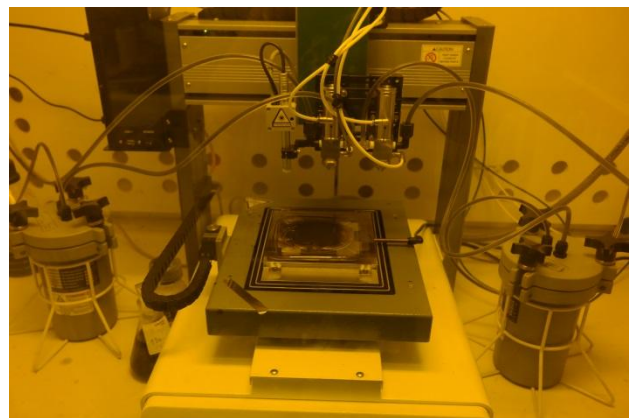
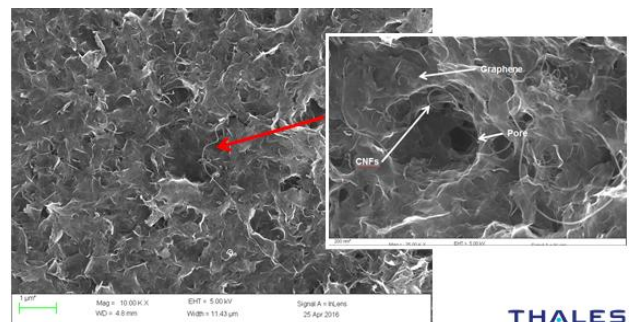


Figure 1. Spray gun deposition machine with two nozzles for nanostructuring.



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Figure 2. Graphene layer nanostructuring exploiting mixture of graphene and carbon nanofibers