

# Nebulization of nanomaterials suspensions for woven non-woven fabrics coating

**Iñigo Torres Peña**

Carlos Gibaja, Brais González, Félix Zamora

*Department of Inorganic Chemistry, Universidad Autónoma de Madrid, E-28049, Madrid, Spain*

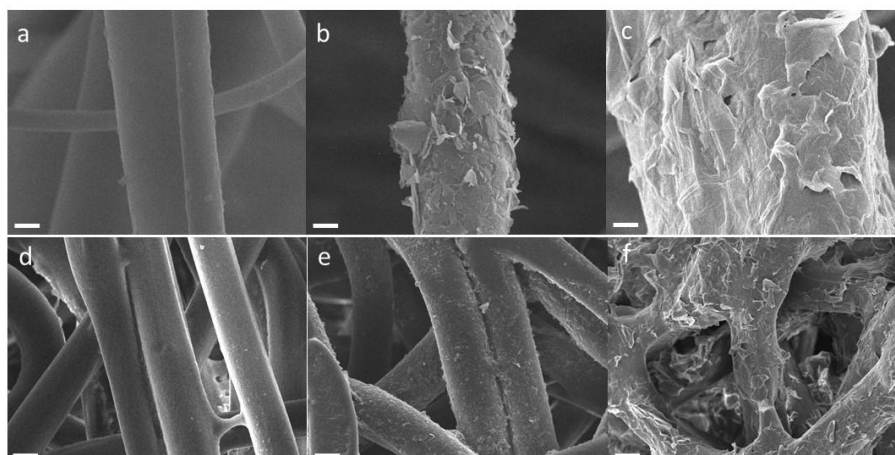
innigo.torres@uam.es

Nanomaterials such as nanoparticles and 2D-materials can be prepared as stable suspensions or colloids in different solvents and/or solvent mixtures [1, 2]. These suspensions are frequently used to prepare composites in which the nanomaterials act as the filler of different organic matrix providing new physical and/or chemical properties [3]. However, in these composites, the area of the nanomaterials at the surface level of the matrix is low. In order to optimize the surface area of the nanomaterial exposed on the surface of the organic polymer, an alternative strategy is the use of the coating [4]. In particular, this approach can be useful for the decoration of woven non-woven fabrics, which are widely used in clothing, home textiles, medical and health, electronics industry, air purification, sewage treatment, among others, because of their excellent performance. This work focuses on the preparation of graphene and graphene oxide suspensions using liquid phase exfoliation and the use of these suspensions for coating polypropylene and polyamide woven non-woven fabrics. The developed nebulization method used in this work is adjustable to different nanomaterials suspensions giving rise to a homogeneous coating of the fibers. Finally, due to the strong interaction between graphene and their derivatives with different viruses [5], the modified textiles are being tested for potential medical health uses and, more specifically, for facial mask modification.

## REFERENCES

- [1] Y. Hernandez, *Nature nanotechnology.*, 3 (2008) 563-568.
- [2] V. Nicolosi, M. Chhowalla, M.G. Kanatzidis, M.S. Strano, J.N. Coleman, *Science*, 340 (2013) 1226419.
- [3] K.M.F. Shahil, A.A. Balandin, *Nano Letters*, 12 (2012) 861-867.
- [4] D.D. Nguyen, N.-H. Tai, S.-B. Lee, W.-S. Kuo, *Energy & Environmental Science*, 5 (2012) 7908-7912.
- [5] P. Innocenzi, L. Stagi, *Chemical Science*, 11 (2020) 6606-6622.

## FIGURES



**Figure 1:** SEM images of (a) Fibres of non-woven Polypropilene (NW-PP). (b) NW-PP fibres modified with graphene. (c) NW-PP fibres modified with GO. Scale bar in (a-c) 1  $\mu$ m. (d) Fibres of non-woven Polyamide NW-PA before been modified. (e) NW-PA fibres modified with graphene. (f) NW-PA fibres modified with GO. Scale bar in (d-f) 10  $\mu$ m.