

Novel electrohydrodynamic processes to deposit nanoparticles for surface tailoring

A. Verdu¹, D. Galan², E. Bugnicourt³

¹⁻²*Bioinicia S.L.*

C/Algepser 65 – Nave 3, Valencia, Spain

³*IRIS Innovacio I Recerca Industrial i Sostenible S.L.*

Avinguda Carl Friedrich Gauss, 11, Barcelona, Spain

Abstract

The electrohydrodynamic processing (EHDP) techniques are of particular interest as an alternative to conventional deposition and coating techniques since latter ones require a controlled pressure and temperature environments. Compared to other deposition techniques, electrospray deposition (ESD) offers the advantage of a high deposition efficiency (up to 80%) and a reduction of the process steps. Although there have been some industrial efforts to scale up the electrospinning process, both techniques, i.e., electrospinning and electrospraying, have only recently been scaled up via patented multinozzle injectors to an industrial level through Bioinicia S.L.

Through OptiNanoPro project nano-enhanced coating has been applied by electrospinning/electrospraying. These technologies have been used to obtain both self-cleaning OPVs and product repellent surfaces (with tailored repellence to selected substances) for easy emptying packaging. Bioinicia S.L. has achieved materials with tailored polarity including super hydrophobic properties but also amphiphobic ones, a quite peculiar behaviour that is much less reported in the literature. This process has required a novel multistep approach developed by Bioinicia S.L. on how to use electrohydrodynamic processes to obtain stable layers with target characteristics.