

Synthesis and applications of multifunctional 3D nanoarchitectures

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Abstract. In this presentation, we will present our last advances in exploitation of a the soft-template procedure based on the use of single-crystal small-molecule nanowires as 1D and 3D supported templates. We will demonstrate the application of vacuum and plasma-assisted deposition techniques to develop complex nanowires (NWs) and nanotubes (NTs) with a core@multishell morphology where each shell adds functionality or multifunctionality to the system. The steps required for the implementation of these nanomaterials as supported or in-device applications will be presented. The universal character of vacuum and plasma methods allows for the deposition of an unprecedented variety of possibilities, including, organic (small-molecules, organic nanocomposites, polymeric layers), inorganic (metal and metal oxides), hybrid (hybrid perovskite) materials acting as conducting, semiconducting, dielectric, photo-absorbent, piezoelectric or plasmonic components in a radial configuration. We will share the results accomplished during the last years in the field of energy harvesting (solar cells,[1,2] piezoelectric and triboelectric nanogenerators[3,4]), wetting [5], and anti-icing,[6] nano-magnetism,[7] photonic sensors,[8] photoelectrocatalysis, and the development of semitransparent nanoelectrodes[9].

References

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