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Plasma functionalization of carbon nanowalls

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Carbon nanowalls (CNWs), which are often described as quasi-two-dimensional lamellar nanostructures based on stacked graphene domains were intensively studied last decade. Lately, the interest for the CNWs moved from their synthesis to their applications. Post-synthesis treatments for improving/modifying some of physico-chemical properties of these nanostructures are usually required for the CNWs integration in applications, like superhydrophobic coatings, fuel cells, batteries, catalytic devices, biosensors.

In our previously works [1] we have already shown that some characteristics of CNWs can be easily controlled and influenced by changing certain parameters during the synthesis process. Another way of tuning their properties is achievable by post-synthesis plasma treatments [2]. In this contribution we present results concerning the tailoring of CNWs properties by plasma functionalization. Two kinds of RF plasmas were used for treatments: a parallel plate discharge and a low pressure plasma jet (the same that was used for CNWs synthesis). We present the changes of morphology, structure, and surface chemistry of CNWs due to treatments. As consequence of treatments the wettability, adhesion and distribution of metal nanoparticles, attachment of biological cells, on the CNWs changed, depending on the type of treatment and the gas mixtures Ar/(O₂, N₂, H₂, NH₃, SF₆, C₂H₂F₄) that were used.

References:

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Keywords

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