

Nanodiamond coupled with polymers: from the control of mutual organization to 3D manufacturing

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The combination of many unsurpassed properties is making detonation nanodiamond (DND) a protagonist in several technological fields, with applications going from optoelectronics to catalysis and nanomedicine. In the field of polymeric nanocomposites manufacturing, DND is definitely playing a primary role. In fact, the contribution of this nanomaterial is not limited only to the improvement of the mechanical and thermal properties of the host polymer matrix. DND has proven also to behave as an extraordinary fillers able to modulate the structural organization of the polymer phase. The multi-functional surfaces of diamond nanoparticles are found to provide complex interfaces where the polymer chains can arrange giving rise to hierarchical diamond/polymer structures with peculiar functional properties [1-3]. In this view, the hybrid nanodiamond/polymers composite has been selected as a model system for the development of innovative ink for 3D printing [4]. This presentation will illustrate the optimization of the protocols for the use of nanodiamonds and for the processing of DND-polymer nanocomposites by additive manufacturing [4].

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