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Carbon nanostructure shapes matter: effect of morphology on functional composites

The family of carbon nanostructures includes elements as diverse as multi-walled and single-walled carbon nanotubes, graphene, carbon nanodots, to cite a few. A common feature is an extended sp2 structure, which results in unique electronic properties that rendered them popular components for advanced functional composites with applications that span across tissue regeneration,1 biomaterials for medicinal use,2 catalysis,3 to cite a few. However, they display a different morphology, hence physical parameters including curvature and porosity. As a result, key physico-chemical properties, such as reactivity and dispersibility, differ, and so does their ability to be functionalized towards interfacing with other components to yield functional composites. The effect of carbon nanostructure morphology on the performance is often a factor difficult to anticipate. Here we report on our most recent findings for uses such as, catalysis in environmentally-friendly processes,4 regenerative medicine,5 soft materials that gain self-healing ability,6 phosphoproteomics, and more. As we understand more of the effects of nanostructure morphology on end-material performance, we can advance our ability to effectively implement the use of carbon nanostructures to bring innovation into our everyday life.

Biography

Silvia Marchesan obtained her PhD in Chemistry at The University of Edinburgh (2008, UK), and after postdoctoral experience in Finland and Australia, she started her academic career at the University of Trieste, first as assistant professor, then as associate professor. She published over 50 peer-reviewed scientific articles and she leads the Superstructures Labs in Trieste where nanomaterials and their functional composites are studied from the molecular level to the macroscopic sizescale.

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