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DIPARTIMENTO DI CHIMICA,
MATERIALI E INGEGNERIA CHIMICA
GIULIO NATTA

Upcycling Combustion Generated Particles

Origin, classification and novel applications of combustion generated particles

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Piazza Leonardo da Vinci, 32 Milano

live | online

link will be emailed to registered participants

Registration Form

Carbon has an absolute leading role in the nanoworld revolution: fullerene, carbon nanotubes, and graphene have become synonyms of nanomaterials, being candidates as materials of the future. Producing these highly ordered carbon nanomaterials (CNs) with high purity and accessible costs encountered difficulties that made their use in common devices yet to be achieved. Conversely, **production of other CNs through furnaces and other processes is diffused worldwide**. Porous carbons, carbon black, and carbon fibers are largely used, mainly as reinforcement in composite polymeric materials, not exploiting their entire potential. **New fields of applications have been envisioned for these CNs** ranging from catalysis, energy conversion and storage, electrochemical/biochemical sensing, and pollutant recovery. Similarly, **Carbon dots (CDs), a new rising star in the carbon family**, have drawn a great deal of attention owing to their distinctive features, which encompass photoluminescence, ease of passivation, and biocompatibility. Due to their superior properties in comparison with other semiconductor QDs, CDs are being widely exploited in various biomedical applications, including diagnosis, cancer therapy, and drug delivery. Nevertheless, CD related technology remains a largely unexplored field.

In this seminar, we present some aspects and challenges related to bottom up synthesis of these carbon nanomaterials, particularly focusing on the high temperature synthesis. Kinetic aspects will be illustrated together with diagnostic problems that are related to a full control not only of the process but also of the final products.

Successively we will move rapidly toward new application of these carbon nanomaterials. Particularly, application of large carbon particles and aggregates (10-100 nm in size) in context of aerogel for pollutants removal and their interaction with viscoelastic media will be presented. Also, the possibility to fix these carbon nanomaterials in thin films, exploring their properties and future application will be also presented.

Finally, flame synthesized CDs for biomedical applications will be presented, as simple and sustainable methods to produce fine-tuned CDs to be used in cancer diagnostics and therapy.

