FUNCTIONAL CARBONACEOUS MATERIALS SYNTHESIS, CHARACTERIZATION AND PROPERTIES

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Abstract

The solid-state pyrolysis of suitable organic precursors in air under mild conditions provides a versatile and convenient way to directly synthesize a wide range of functional carbonaceous materials with interesting physico-chemical properties. Conceptually, this humble but quite effective method does not require any advanced experimental setup or delicate reaction conditions except for a persistent searching among a library of organic compounds in order to end up with just a few number of promising precursors exhibiting—preferentially—a simple non-aromatic structure. In addition, the method leads to single phase and high purity materials at yields that are sufficient enough for the preparation of samples in bulk quantities. Lastly, it enables the direct incorporation of property-influential heteroatoms or surface functional groups in the solid without the need of any chemical post-treatment, i.e. the functional material is obtained just in a single step.

Based on this simple pyrolytic approach, in the present talk we will overview the synthesis and characterization of a versatile class of functional carbonaceous materials with peculiar properties, like thin films, porous foams, nanoparticles, graphite oxide-mimicking layered solids, nanosheets, beads/wires and resins.

Keywords: