

POTENTIAL SOURCES, SYNTHESIS METHODS AND INDUSTRIAL APPLICATIONS OF WASTE GENERATED GRAPHENE-BASED NANOCOMPOSITES

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One of the most urgent worldwide problems is waste treatment, burdening all human activities from households to large industries, which increases in parallel with the overpopulation. In this presentation, we overview different type of waste sources which can be easily converted to carbon particles for large scale composite production by nanotechnology. In the past decade, graphene-based nanocomposites and carbonaceous composite materials gain significant interest in terms of potential environmental applications. Due to its versatile composite and film forming capabilities, graphene-based materials such as graphitic carbon, graphene, graphene-oxide and reduced graphene-oxide can act both as matrix or filler in composite materials. Moreover, the sp^2 hybrid state of carbon atoms in the honeycomb like lattice structure prove remarkable electric and conductive characteristics, which can be heavily influenced by the degree of oxidation matrix-filler ratio and the type of the other components. In addition, carbonaceous materials are applied to improve the mechanical properties of structural materials for long time. Traditional applications such as membrane filtering or adsorption processes can be also built on waste-derived graphene based nanocomposites. In terms of electrical applications, due to the bandgap influenced by the composition the photocatalysis is also a potential way to reuse graphitic materials. Besides this interesting approach, we highlight how the valorization of waste materials can prove a cost-effective and benign solution in the green synthesis of various carbon based nanocomposites.

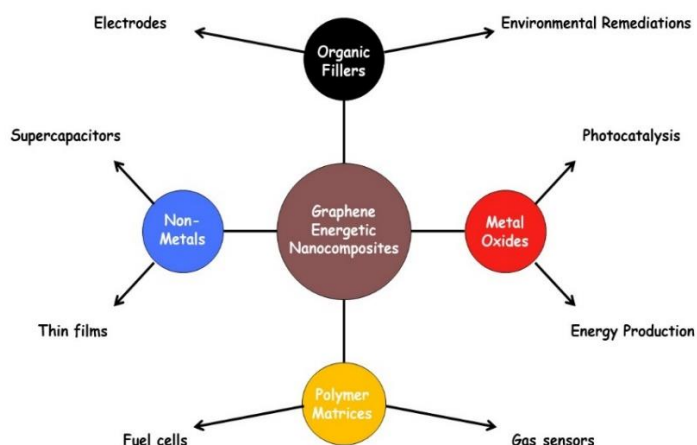


Fig.1. Illustration of the main classes of graphene energetic nanocomposites.

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