



Abstract

A Lithuanian university has developed a new technology to manufacture membranes and coatings made of graphene or oxidized graphite products. These membranes are flexible, uniform, and biocompatible. Membranes and coatings could be used as electrodes in energy accumulation, information display systems, biointerfaces, etc. The university is looking for industrial partners for licensing of the technology and further development.

Description

Graphene is strictly two-dimensional material, which exhibits exceptionally high crystal and surface quality. Due to the combination of unique properties (electronic, optical and mechanical), graphene has already found a number of potential applications, including different fields in electronics, high-energy physics, anti-corrosion coatings, etc.

The most promising among the methods of the preparation of graphene coatings are these using graphite oxide as a precursor. They overcome the competitive methods in productivity, efficiency and profitability. Moreover, coatings made of graphite oxide and different graphene precursors have many possible commercial applications.

In the Lithuanian university coatings/membranes on a polymer substrate (e.g., polycarbonate) have been prepared from graphite oxide and other products of oxidized graphite by means of an innovative technology, which combined the steps of filtration and layer-by-layer assembly. Further processing by adding the reducing agents (e.g., ascorbic acid) was aimed to convert the single-sheet pre-graphene precursor particles into more compact graphene sheets. The products of oxidized graphite have been synthesized in the Lithuanian university in accordance with the preparation protocol developed in the laboratory. Minimum thickness of the layer in the obtained coatings was ~20 nm. The as-produced coatings/membranes were of high quality (in terms of homogeneity), and mechanically resistant (ultrasonic

disintegration test). Thin coatings were optically transparent and electroconductive. Membranes made of the products of oxidized graphite were highly biocompatible to be used with enzyme electrodes and obtain the effect of direct electron transfer.

Innovations and advantages of the offer

1. Products of oxidized graphite, used for the preparation of nanostructured coatings/membranes are synthesized from graphite precursor by a novel method developed in the laboratory.
2. Graphene membranes are prepared by using a modified protocol of filtration of water suspension; which includes the elements of layer-by layer assembly.
3. In comparison with the similar membranes and coatings made of carbon nanotubes, graphene and graphite oxide membranes are much cheaper.

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For further information (including IPR status) please contact:

Camillo Ferrari

Phone: +39 0732 626.511

Fax: +39 0732 626.939

Email: servizi2@meccano.it