

Influence of graphene derivatives on the selected properties of post-consumer PETG foil

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A type of 2D graphitic nanofiller consisting of stacked graphene layers are graphite nanoplatelets (GNP), also called graphite nanosheets (GNS) and graphite nanoflakes (GNF), or just simply exfoliated or expanded graphite (EG). The discovery of graphene and graphene derivatives with its combination of extraordinary physical properties and ability to be dispersed in various polymer matrices has created a new class of polymer nanocomposites that have shown immense potential applications in the fields of electronics, aerospace, automobile, defense industries, green energy, etc., due to its exceptional reinforcement in composites [1].

The main objective of the study is to investigate the effect of the addition of graphene derivatives on the morphology, interphase interaction, electrical, mechanical and barrier properties of nanocomposites and consequently draw conclusions about the creation the percolation paths and strengthening mechanism of polymer matrix with graphenes derivatives. Also the specific features that indicate the functional nature of the obtained nanocomposites will be identified. Determination of the conditions for obtaining nanocomposites with the participation of graphene derivatives during the glycolysis of post-consumer PETG foil (that constitutes the matrix) may form the basis for the development of the technology and obtain these materials in a pilot scale or industrial scale [2].

Characteristics of the physical properties of the obtained polymer nanocomposites proved that the addition of graphene derivatives with a concentration of not higher than 1.0 wt % to PETG post-consumer foils allows to obtain lightweight composite materials, exhibiting enhanced thermal stability, improved mechanical properties and electrical conductivity. These features come together with the requirements of modern materials for various industries and are the result of the phenomena occurring in the polymer in the presence of carbon nanofillers and the interaction between the two phases.

References:

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Acknowledgments

This work is the result of the research project GEKON2/O5/266860/24/2016 funded by the National Centre for Research and Development and National Fund for Environmental Protection and Water Management, Poland.

Theme: Material Science

Track: Polymer matrix composites