

## Active Food Packaging Films Based on Functionalized Graphene/Polymer Composites

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**Abstract :** Biodegradable polymers are of great interest, especially for biomedical and packaging applications. Current research efforts are focused on the development of biopolymers with the purpose of reducing the plastic pollution induced by the widely used in biodegradable polyolefins. The main challenge is focused on the elaboration of biopolymers having properties competitive to those of polyolefins. On the other hand, graphene oxide (GO), a graphene derivative, is characterized by the presence of several functional groups on the surface such as carboxylic, hydroxyl and epoxide. This feature enables modification of GO surface with different modifiers to obtain versatile surface properties and overcome the problem of graphene sheets aggregations during inclusion in a polymer matrix. In this context, poly (butylene succinate) (PBS) as promising biopolyester is modified through blending with different ratios of functionalized (GO) to improve its barrier properties. Modification of GO has been carried out using different hyperbranched polymeric structures in order to increase miscibility of the nanosheets in the hosting polymeric matrix. Films have been prepared from the modified PBS and their mechanical, thermal and gas barrier properties were investigated. The results reveal enhancement in the thermal and mechanical properties beside observed improvement of the barrier properties for the films prepared from the modified PBS. This improvement is related to the strong dependence on tortuosity effects of dispersion, exfoliation levels of fillers into the polymer matrix and interactions between the fillers and the polymer matrix.

**Keywords :** gas barrier properties, graphene oxide, food packaging, transport properties

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