COPOLYMERS BASED ON POLYESTER AND AROMATIC POLYCARBONATE

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Invention

The new patented materials feature a copolymer structure containing biodegradable polyester segments and aromatic polycarbonate segments (20%), prepared by a reactive mixing process.

Compared to the homopolymer polyester, these materials exhibit improved mechanical properties at temperatures above the glass transition (Tg) of polyester (60 °C) and below 110 °C, resulting in improved dimensional stability in the mentioned temperature range.

These properties derive from two concomitant factors: the presence of a second glassy phase characterized by a high Tg (around 150 °C) and a high adhesion between the two phases, consisting respectively of polylactic acid (PLA) and polycarbonate (PC), which are covalently linked as demonstrated by exclusion chromatography experiments (SEC, fig.1). An advantageous feature of the new materials is their higher resistance to temperature-induced deformation compared to a PLA homopolymer of similar molecular weight. In addition, the compostability and biodegradability characteristics of these materials contribute to solving the problems of accumulation of traditional polymeric materials from waste products from the following application areas.

Drawings & pictures

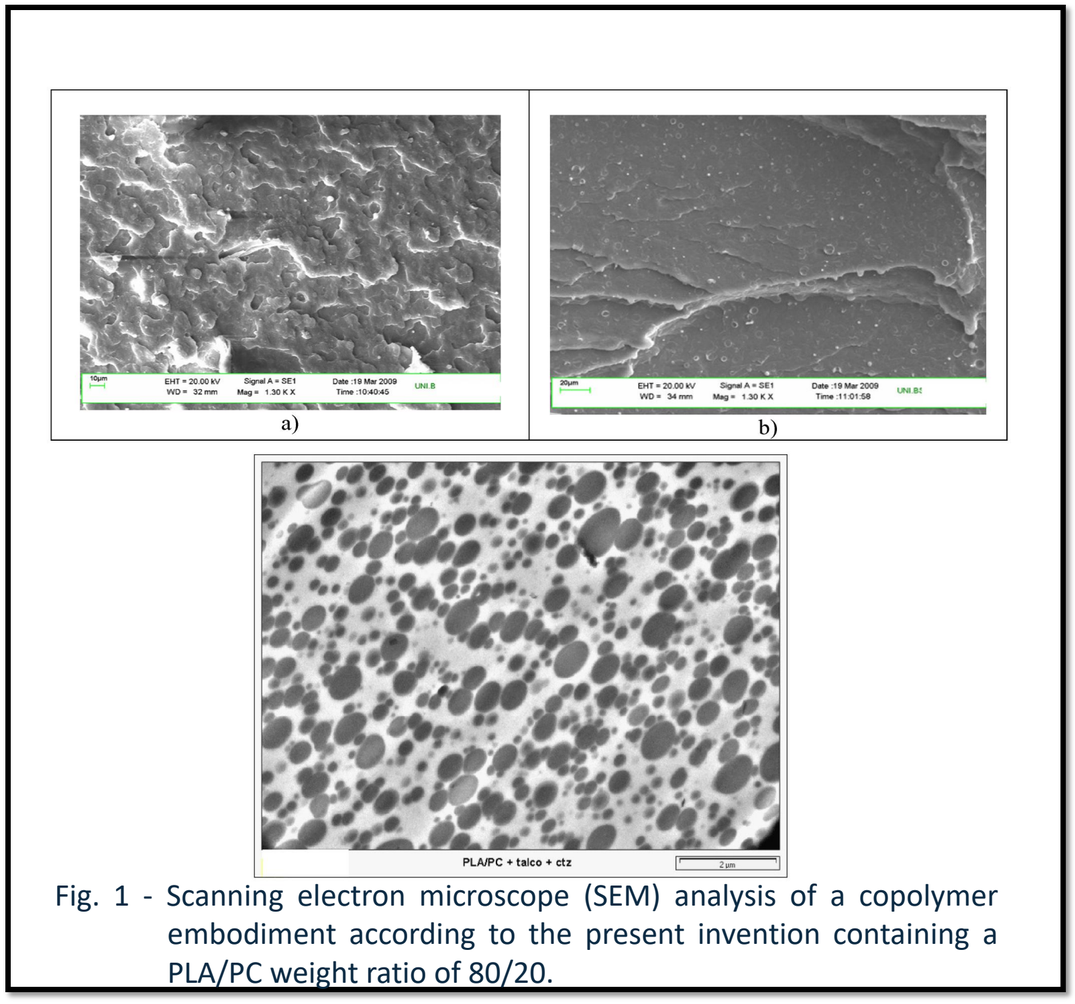

Fig. 1 - Scanning electron microscope (SEM) analysis of a copolymer embodiment according to the present invention containing a PLA/PC weight ratio of 80/20.

Industrial applications

- Packaging sector;
- Automotive and transport sector;
- Electrical and electronic sector;
- Building and architectural applications.

The copolymers can be used for the production of products such as mobile phone shells, satnav shells, portable echo sounders, car seats or parts thereof.
Preparation of the copolymers according to the patented method allows the two phases to be mixed quickly (between 4 and 20 minutes) and at lower temperatures than those generally used. The addition of cellulosic microfibres leads to a substantial increase in the mechanical characteristics (strength, stability) of the material as the temperature increases.

Possible developments

An industrial partners collaboration could be beneficial for the marketing of new products such as mobile phone shells, satnav shells, portable echo sounders, car seats or parts thereof, having a higher mechanical resistance to temperature-induced deformation. Another highly relevant aspect of the patented copolymers is that they are compostable and biodegradable thanks to the polymer precursors used during production phases.

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