COPOLYMERS BASED ON REACTIVE POLYESTERS AND PLASTICISERS FOR THE MANUFACTURE OF TRANSPARENT, BIODEGRADABLE PACKAGING FILM

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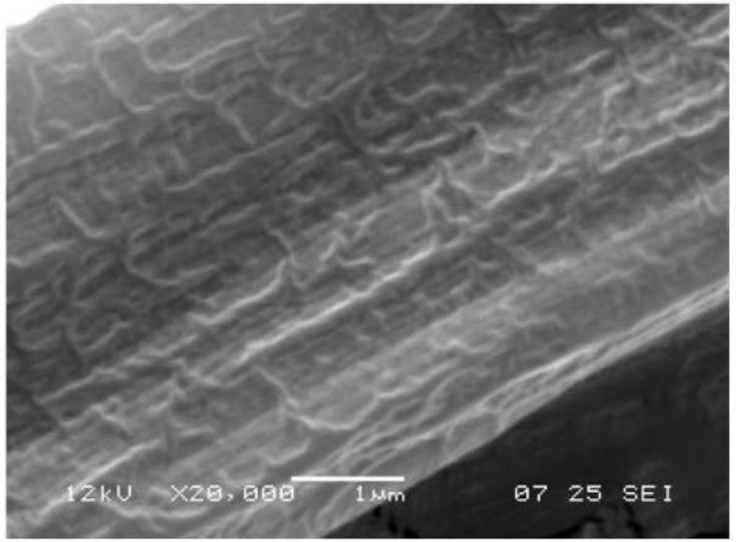
Invention

The present invention relates to the preparation and use of novel copolymers comprising polylactic acid (PLA), organic plasticizers with epoxy functionality and biodegradable polyester elastomers.

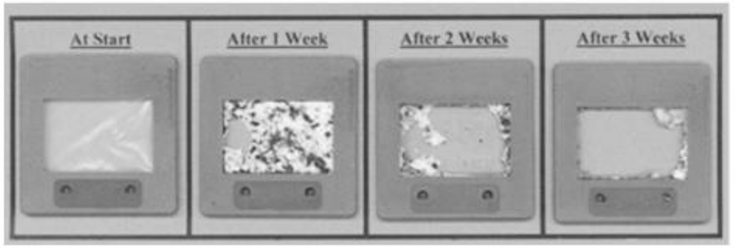
The invention relates to the preparation by a reactive extrusion process of novel block copolymers, wherein the blocks comprise polylactic acid (PLA), aliphatic or cycloaliphatic glycidyl ether (GE) and a biodegradable elastomeric copolyester, covalently bonded to the PLA during the copolymerisation process.

The innovative copolymer includes a higher content of renewable sources and has a lower cost compared to the many biodegradable PLA and polyester-based products on the market nowadays. It is also transparent and presents optimal mechanical characteristics for the production of packaging films and shopping bags; increased mechanical strength, even at temperatures below 40 °C; good deformability; good elastic return, accompanied by softness to the touch.

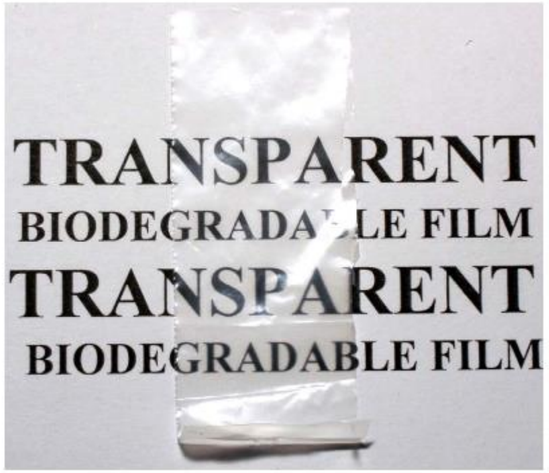
Drawings & pictures



Scanning electron microscope (SEM) analysis of a sample of 5F9-2298. From a morphological point of view, all the copolymers prepared show a monophasic structure.



Visual trend of biodegradation of a sample.



Industrial applications

- Manufacturing sector for the production of packaging films, sacks, bags and shoppers;
- Chemical sector (reactive mixing using transesterification catalysts and high temperatures).

Increasing concern about the environmental impact and sustainability of traditional plastics has led to the development of new materials derived from renewable sources, particularly for use in the production of bags (shoppers).
In this context, polymers derived from agricultural sources, such as polylactic acid (PLA) and its copolymers, are of great importance to date. Currently, one of the processes used in the production of PLA is from corn starch. There are numerous biodegradable products based on PLA and polyesters on the market, but none of them have optical (transparency) and mechanical properties comparable to traditional plastics.

Possible developments

The innovative copolymer, designed to improve environmental sustainability, is prepared with a higher content of renewable resources and a lower cost than the many biodegradable PLA and polyester-based products on the market nowaday.

An industrial partners collaboration could be advantageous for the marketing of new products of daily use, such as biodegradable packaging films, sacks, bags and shoppers, with better qualities of mechanical resistance, elasticity, transparency and adaptable to all the requirements.

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