PROCEDURE FOR THE PRODUCTION OF A COMPATIBILIZED MIXTURE OF A POLYOLEFIN AND A POLAR POLYMER

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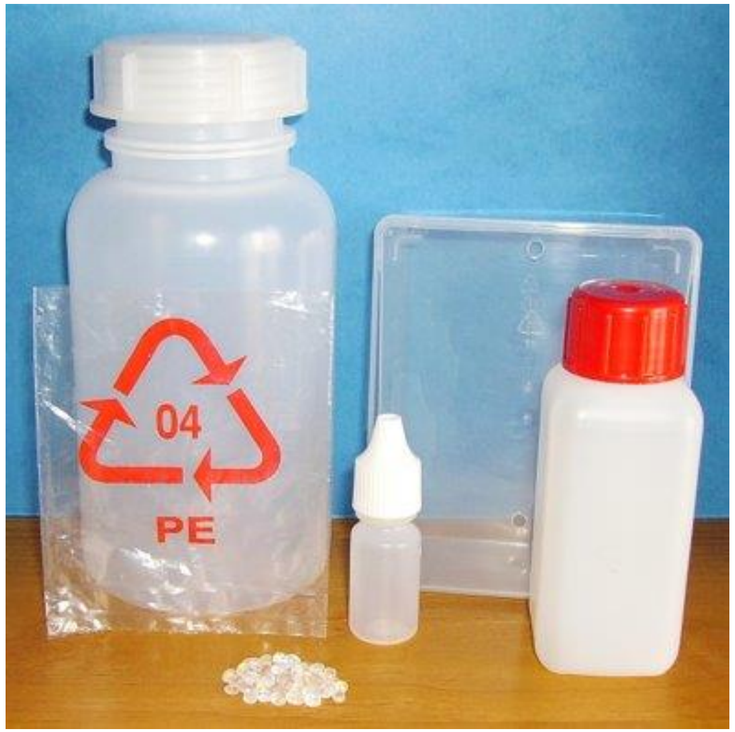
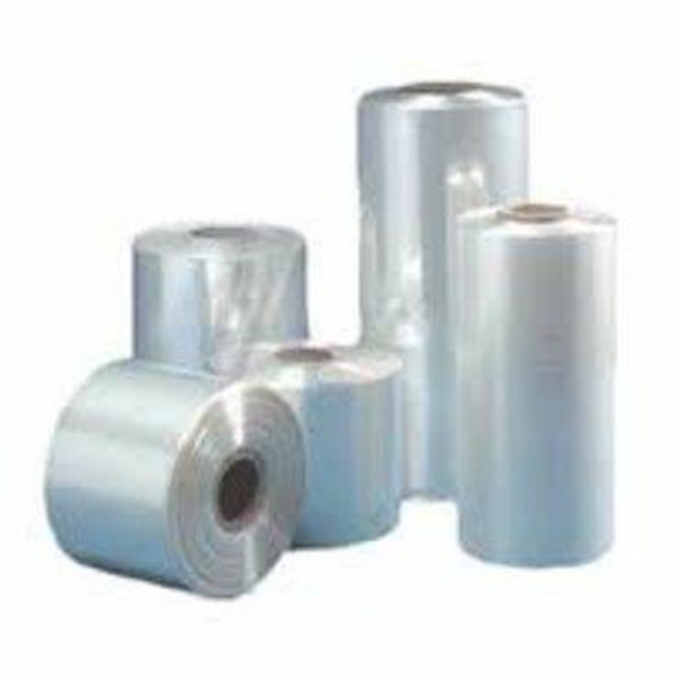
Invention

The present patent application is based on a reactive mixing process of ethylene polymers and polyamides developed by us, through which it is possible to obtain in a single step (one-step) master batch with polyolefinic or inverse matrix where the two phases compatible with each other generate a stable system that can be used for the easy preparation (simple mixing) of a wide range of composite materials through the addition of products compatible with the polyolefinic phase (such as various hydrocarbon-based polymers) or with the polyamide phase (various polyamides or polyarylamides, polymers containing carbonyl groups, silica and clays). Among the obtainable composites are those with mechanical and rheological properties aimed at obtaining polyolefin materials with increased mechanical and barrier properties and anti-shock polyamides, organic/inorganic hybrid micro and nanocomposites.

The proposed system involves the use of "chemicals" easily available and low cost that act in the melt during the process of reactive mixing (in discontinuous mixer or extruder) through radical reactions, directly on the polyolefin / polyamide mixture.

Drawings
& pictures





Industrial applications

This patent is addressed to the whole sector of plastic and rubber industry with reference to the industry of thermoplastic material compatibilizers, blending and compounding. The main sectors of use can be traced back to the field of film co-extrusion and blow molding; pipes for fuels, natural gas and water); adhesions to metals (co-extruded structures); compatibilization of polymeric blends (impact modification); dispersing agents for blends (masterbatch); revaluation of recycled plastics; increase of filler content. The industries involved are all those related to the transformation of plastic materials such as the cable industry and the automotive industry. Stabilized masterbatches can also be effectively used as "compatibilizers" in the recycling of polar or hydrocarbon polymeric materials and their laminates.

Possible developments

Numerous one-step reactive blending tests have been performed in our research laboratory using varying polyolefin/polyamide 20/80 and 80/20 compositions. The tests were carried out using a functionalizing mixture composed of maleic derivatives and peroxides at varying concentrations depending on the ratio of the two polymers. The products obtained have been characterized both from the analytical point of view, with particular reference to the degree of functionalization or grafting between the two phases, and from the point of view of mechanical properties: the materials obtained with the one-step process developed by us have shown a good degree of compatibility and mechanical properties (with particular reference to the Izod Impact test) comparable and in some cases superior to similar products obtained with conventional methods. These materials can be mixed with remarkable dispersive efficiency with PO/PA/SIO, even with mechanical mixers with low characteristics.

The research team is interested in considering transfer of the patented technology for exploitation by third parties.

For more information:

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