maleic anhydride, propylene-maleic anhydride, isobutylene-maleic anhydride copolymers and terpolymers such as ethylene-propylene-maleic anhydride terpolymer.

It will be appreciated that products which are made from polyamides are exposed to considerable stresses during manufacture and processing, and that a method for producing nylons or other polyamides with increased durability would be appreciated in the art, and that specific nylon formulations having increased durability will be greatly appreciated in the art.

SUMMARY

In one aspect, there is provided a thermoplastic pelletizable polymer composition comprising: (a) a polyamide; and (b) a polymer polymerized from maleic anhydride and an olefin selected from the group consisting of ethylene, propylene, isobutylene, butene-1, octene, butadiene, isoprene, hexane, dodecene, dodecene-1, and tetradecene; wherein the polyamide and the polymer are compounded.

In another aspect, there is provided a cross-linked polymer composition comprising: (a) a polyamide, and (b) a polyamide; and (b) a polymer polymerized from maleic anhydride and an olefin selected from the group consisting of ethylene, propylene, isobutylene, butene-1, octene, butadiene, isoprene, hexane, dodecene, dodecene-1, and tetradecene; wherein the polyamide and the polymer are compounded at a processing temperature wherein the processing temperature is sufficient to promote cross-linking.

In another aspect, there is provided a method of preparing a compounded polyamide comprising: compounding a polyamide mixture comprising a polyamide and an olefin-maleic anhydride copolymer, wherein the olefin is selected from the group consisting of ethylene, propylene, isobutylene, butene-1, octene, butadiene, isoprene, hexane, dodecene, dodecene-1, and tetradecene, at a processing temperature.

In another aspect, there is provided a method of producing a compounded polyamide, comprising compounding a polyamide mixture, where the polyamide mixture comprises an olefin-maleic anhydride copolymer with the olefin selected from the group consisting of ethylene, propylene, isobutylene, butene-1, octene, butadiene, isoprene, hexane, dodecene, dodecene-1, and tetradecene; a glass fiber and; one or more stabilizing agents at a temperature of between about 230°C and about 300°C.

In another aspect, there is provided a compounded polyamide produced by a process comprising compounding a polyamide mixture, comprising a polyamide and an olefin-maleic anhydride copolymer, wherein the olefin is selected form the group consisting of ethylene, propylene, and isobutylene at a processing temperature.

In another aspect, there is provided an article comprising the compounded polyamide or the polymer composite as defined above, wherein the article is selected from the group consisting of carpet fiber, apparel, an airbag, a tire, a rope, a conveyor belt, a hose, luggage, a molded auto part, a molded gun frame, a molded electrical part, a molded tool handle, toothbrush, a comb, a hairbrush, a food packaging film, an oil-resistant gasket, and bullet-resistant materials.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 Shows reduction of viscosity at high shear resulting from compounding a nylon (e.g. nylon-6) with EMA.

DESCRIPTION

The disclosure of the present application provides for compositions comprising polyamides with such olefin-maleic anhydride polymers (OMAP).

The disclosure of the present application also provides various methods for producing compounds of polyamides with ethylene maleic anhydride copolymers (EMA). Specifically, at least one embodiment of the present disclosure relates to methods for the reaction of nylon-like materials with ethylene maleic anhydride copolymers. At least one embodiment of the present disclosure involves processing methods such as extrusion compounding using equipment known to one skilled in the art. In the plastics industry, compounding is a process that mixes one or more polymers with one or more additives to produce plastic compounds in one or more steps. The feeds may be pellets, powder and/or liquids, but the product is usually in pellet form, to be used in other plastic-forming processes such as extrusion and injection molding. Machine size varies from tiny lab machines to the biggest extruders in the industry, running as much as 20 tons per hour. Usually twin-screw extruders are preferred because they give better mixing at lower melt temperatures. Most of

these have screws and barrels made up of smaller segments (mixing, conveying, venting and additive feeding) so that the design and sequence of addition of each of the ingredients in the formulation can be changed to meet the production and product needs. Other equipment such as single-screw extruders, oscillating screw extrusion, continuous mixers, Banbury mixers, and planetary extruders can be used for compounding as well. The additional components to be mixed and/or compounded (viscosity modifiers, additive carriers, and the like) and the processing parameters such as temperature of each of the zones, feed rates, residence time