Thermoplastic molding composition

Description

The present invention relates to a thermoplastic molding composition comprising polyamide-6 and a semiaromatic polyamide which can be used for preparing fibers, foils or moldings.

Thermoplastic polyamides, such as polyamide-6 and polyamide-66, are often used in the form of glass fiber-reinforced molding compositions with a good processability, good mechanical properties and good resistance against numerous chemicals. Due to the water intake these polyamide compounds have significantly reduced mechanical parameters in humid environments compared to dry air conditions.

By including an amorphous semiaromatic polyamide-6I/6T in polyamide-66 glass fiber reinforced polyamide compounds can be obtained which have improved mechanical properties in humid environments at temperatures of up to 60° C, compared to glass fiber-reinforced polyamide-6 or polyamide-66 without additives.

EP 0 400 428 A1 discloses thermoplastic molding compositions comprising polyamide-6T/6 or polyamide-66 to which polyamide-6I/6T is added for improving the mechanical properties.

EP 0 728 812 A1 discloses thermoplastic molding compositions based on polyamide-6T/6 or polyamide-6T/6I to which a copolyamide-6I/6T is added for improving the mechanical properties.

A disadvantage of polyamide-66/polyamide-6I/6T blends is the high melting point of 260° C, which is near the melting point of pure polyamide-66. Furthermore, the blends have a small temperature window for their application, since above 60° C the materials, due to the amorphous polyamide content, show only weak mechanical properties.

The object underlying the present disclosure is to provide fiber or particulate-reinforced polyamide compositions which overcome the disadvantages of the known molding compositions, specifically the high melting point and the significant decrease in mechanical properties at elevated temperatures.

The object is achieved according to the present disclosure by a thermoplastic molding composition, comprising

A) from 10 to 60% by weight of a thermoplastic semicrystalline polyamide-6,
B) from 5 to 50% by weight of a thermoplastic semiaromatic semicrystalline polyamide containing repeating units of hexamethylenediamine and terephthalic acid,
C) from 10 to 65% by weight of fibrous and/or particulate fillers,
D) from 0 to 30% by weight of further additives,

where the total of the percentages by weight of components A) to D) is 100%.

In one aspect, the present disclosure refers to a thermoplastic molding composition, comprising

A) from 10 to 60% by weight of a thermoplastic semicrystalline polyamide-6,

B) from 5 to 50% by weight of a thermoplastic semiaromatic semicrystalline polyamide containing repeating units of hexamethylenediamine and terephthalic acid,

C) from 10 to 65% by weight of fibrous and/or particulate fillers,

D) from 0 to 30% by weight of further additives,

where the total of the percentages by weight of components A) to D) is 100%, wherein the weight ratio of component A) to component B) is 1 : 1 to 10 : 1.

The disclosure also relates to the use of a thermoplastic semiaromatic semicrystalline polyamide containing repeating units of hexamethylenediamine and terephthalic acid as an additive for thermoplastic semicrystalline polyamide-6 compositions for improving the mechanical properties at temperatures above 60° C and in humid environments.

In another aspect, the present disclosure refers to the use of a thermoplastic semiaromatic semicrystalline polyamide containing repeating units of hexamethylenediamine and terephthalic acid as an additive for thermoplastic semicrystalline polyamide-6 compositions for improving the mechanical properties at temperatures above 60° C and in humid environments wherein the weight ratio of the thermoplastic semicrystalline polyamide-6 compositions to the thermoplastic semiaromatic semicrystalline polyamide containing repeating units of hexamethylenediamine and terephthalic acid is 1 : 1 to 10 : 1.

In yet another aspect, the present disclosure also relates to the use of these thermoplastic molding compositions as defined above for producing fibers, foils, and moldings of any type.

In yet another aspect, the present disclosure relates to a fiber, foil or molding, made of these thermoplastic molding compositions as defined above.

According to the present invention, it has been found that a combination of thermoplastic semicrystalline polyamide-6 and a thermoplastic semiaromatic semicrystalline polyamide, containing repeating units of hexamethylenediamine and terephthalic acid as well as a fibrous or particulate filler, achieves the above mentioned object.

The amount of component A) is 10 to 60% by weight, preferably 15 to 50% by weight, more preferably 25 to 45% by weight.

The amount of component B) is 5 to 50% by weight, preferably 5 to 40% by weight, more preferably 10 to 25% by weight.

Preferably, the weight ratio of component A) to component B) is at least 1 : 1, more preferably at least 1.1 : 1, most preferably at least 1.5 : 1. Preferably, the weight ratio of component A) to

component B) is 1 : 1 to 10 : 1, more preferably 1.1 : 1 to 7 : 1, most preferably 1.5 : 1 to 5 : 1, specifically 2 : 1 to 4 : 1.

The amount of component C) is from 10 to 65% by weight, preferably 30 to 65% by weight, more preferably 40 to 60% by weight.

The amount of component D) is from 0 to 30% by weight, preferably 0 to 20% by weight, more preferably 0 to 10% by weight. If present, the amount of component D) is 0.1 to 30% by weight, preferably 0.5 to 20% by weight, more preferably 1 to 10% by weight.

Component A) is a thermoplastic semicrystalline polyamide-6.

Component A) preferably has a viscosity number VZ of 10.0 to 250 ml/g, more preferably 120 to 190 ml/g, measured on a 0.5% strength by weight solution in 96% strength by weight of sulfuric acid at 25°C to ISO 307.