SUMMARY

[0006] The above and other needs are met by a polymeric composition according to the current disclosure.

[0006a] In one aspect of the present disclosure, there is provided a polymeric composition comprising:

from 40 to 99 weight percent of a first polymer, wherein the first polymer comprises polyhydroxy alkanoates; and

from 1 to 10 weight percent of polybutylene(succinate-co-adipate) ("PBSA") plasticizer,

wherein the PBSA has a weight average molecular weight from 80,000 to 120,000 and comprises:

from 40 to 60 mole percent moieties derived from 1,4-butanediol,

from 10 to 50 mole percent moieties derived from succinic acid, and

from 10 to 50 mole percent moieties derived from adipic acid.

[0006b] In another aspect of the present disclosure, there is provided a method for making a polymeric composition, comprising the steps of:

reacting 1,4-butanediol with succinic acid and adipic acid to form a pre-polymer;

polymerizing the pre-polymer in a condensation polymerization reaction to form polybutylene(succinate-co-adipate) ("PBSA"); and

blending a first polymer which comprises polyhydroxy alkanoates with the PBSA to form a polymeric composition in which the PBSA functions as a plasticizer, wherein the polymeric composition comprises from 40 to 99 weight percent of the first polymer; and from 1 to 10 weight percent of the PBSA, and

wherein the PBSA has a weight average molecular weight from 80,000 to 120,000 and comprises:

from 40 to 60 mole percent moieties derived from 1,4-butanediol,

from 10 to 50 mole percent moieties derived from succinic acid, and

from 10 to 50 mole percent moieties derived from adipic acid.

WHAT IS CLAIMED IS

Claim 1. A polymeric composition comprising:

from 40 to 99 weight percent of a first polymer, wherein the first polymer comprises polyhydroxy alkanoates; and

from 1 to 10 weight percent of polybutylene(succinate-co-adipate) ("PBSA") plasticizer,

wherein the PBSA has a weight average molecular weight from 80,000 to 120,000 and comprises:

from 40 to 60 mole percent moieties derived from 1,4-butanediol,

from 10 to 50 mole percent moieties derived from succinic acid, and

from 10 to 50 mole percent moieties derived from adipic acid.

Claim 2. The polymeric composition of Claim 1, wherein the PBSA has a viscosity from 15,000 to 40,000 centipoise at a temperature of 215 °C.

Claim 3. The polymeric composition of Claim 1, wherein the PBSA has a melting point from 20 °C to 75 °C.

Claim 4. The polymeric composition of Claim 1, wherein the PBSA has a melting point from 25 °C to 40 °C.

Claim 5. The polymeric composition of Claim 1, wherein the composition further comprises at least one additive selected from the group consisting of fillers, pigments, stabilizers, co-stabilizers, secondary plasticizers, lubricants, impact modifiers, and viscosity reducers.

Claim 6. A method for making a polymeric composition, comprising the steps of:

reacting 1,4-butanediol with succinic acid and adipic acid to form a pre-polymer;

polymerizing the pre-polymer in a condensation polymerization reaction to form polybutylene(succinate-co-adipate) ("PBSA"); and

blending a first polymer which comprises polyhydroxy alkanoates with the PBSA to form a polymeric composition in which the PBSA functions as a plasticizer, wherein the polymeric composition comprises from 40 to 99 weight percent of the first polymer; and from 1 to 10 weight percent of the PBSA, and

wherein the PBSA has a weight average molecular weight from 80,000 to 120,000 and comprises:

from 40 to 60 mole percent moieties derived from 1,4-butanediol,

from 10 to 50 mole percent moieties derived from succinic acid, and

from 10 to 50 mole percent moieties derived from adipic acid.

Claim 7. The method of Claim 6, wherein the PBSA has a viscosity from 15,000 to 40,000 centipoise at a temperature of 215 °C.

Claim 8. The method of Claim 6, wherein the PBSA has a melting point from 20 °C to 75 °C.

Claim 9. The method of Claim 6, wherein the PBSA has a melting point from 25 °C to 40 °C.

Claim 10. The method of Claim 6, wherein the polymerization of the pre-polymer to form PBSA is carried out using a metal oxide or an organometal oxide catalyst, wherein the metal in the metal oxide or organometal oxide catalyst is selected from the group consisting of titanium, zirconium, tin, germanium, antimony, hafnium, and bismuth.

Claim 11. The method of Claim 6, wherein the polymerization of the pre-polymer to form PBSA is carried out using a catalyst selected from the group consisting of titanium isopropoxide, zirconium butoxide, and mixtures thereof.