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 is selected from the group consisting of polyvinyl chloride, polylactic acid, polyhydroxy alkanoates, and mixtures thereof; and

from 1 to 60 weight percent of polybutylene(succinate-co-adipate) ("PBSA"),

wherein the PBSA 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 selected from the group consisting of polyvinyl chloride, polylactic acid, polyhydroxy alkanoates, and mixtures thereof with the PBSA to form a polymeric composition, wherein the polymeric composition comprises from 40 to 99 weight percent of the first polymer; and from 1 to 60 weight percent of the PBSA, and

wherein the PBSA 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.

[0006c] According to one embodiment, the polymeric composition includes from about 40 to about 99 weight percent of a first polymer; and from about 1 to about 60 weight percent of polybutylene(succinate-co-adipate) ("PBSA").

[0007] In certain embodiments of the polymeric composition, the first polymer is preferably selected from the group consisting of polyvinyl chloride, polylactic acid, polyhydroxy alkanoates, and mixtures thereof.

[0008] In some embodiments of the polymeric composition, the PBSA preferably has a weight average molecular weight from about 50,000 to about 200,000. More preferably, the PBSA has a weight average molecular weight from about 80,000 to about 120,000. Further, in certain embodiments, the PBSA preferably has a viscosity from about 15,000 to about 40,000 centipoise at a temperature of about 215 °C.

[0009] In some instances, the PBSA of the polymeric composition preferably has a melting point from about 20 °C to about 75 °C. More preferably, the PBSA has a melting point from about 25 °C to about 40 °C.

[0010] For certain embodiments of the polymeric composition, the PBSA is preferably made up of from about 40 to about 60 mole percent moieties derived from 1,4-butanediol, from about 10 to about 50 mole percent moieties derived from succinic acid, and from about 10 to about 50 mole percent moieties derived from adipic acid.

[0011] In certain embodiments of the polymeric composition, the polymeric composition includes from about 1 to about 10 weight percent of the PBSA. More preferably, the polymeric composition includes from about 50 to about 60 weight percent of the PBSA.

[0012] In some embodiments of the polymeric composition, the polymeric composition may also include also include at least one additive selected from the group consisting of fillers, pigments, stabilizers, co-stabilizers, secondary plasticizers, lubricants, impact modifiers, and viscosity reducers.

WHAT IS CLAIMED IS

Claim 1. A polymeric composition comprising:

from 40 to 99 weight percent of a first polymer, wherein the first polymer is selected from the group consisting of polyvinyl chloride, polylactic acid, polyhydroxy alkanoates, and mixtures thereof; and

from 1 to 60 weight percent of polybutylene(succinate-co-adipate) ("PBSA"), wherein the PBSA 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 weight average molecular weight from 50,000 to 200,000.

Claim 3. The polymeric composition of Claim 1, wherein the PBSA has a weight average molecular weight from 80,000 to 120,000.

Claim 4. 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 5. The polymeric composition of Claim 1, wherein the PBSA has a melting point from 20 °C to 75 °C.

Claim 6. The polymeric composition of Claim 1, wherein the PBSA has a melting point from 25 °C to 40 °C.

Claim 7. The polymeric composition of Claim 1, wherein the composition comprises from 1 to 10 weight percent of the PBSA.

Claim 8. The polymeric composition of Claim 1, wherein the composition comprises from 50 to 60 weight percent of the PBSA.

Claim 9. 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 10. 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 selected from the group consisting of polyvinyl chloride, polylactic acid, polyhydroxy alkanoates, and mixtures thereof with the PBSA to form a polymeric composition, wherein the polymeric composition comprises from 40 to 99 weight percent of the first polymer; and from 1 to 60 weight percent of the PBSA, and

wherein the PBSA 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 11. The method of Claim 10, wherein the PBSA has a weight average molecular weight from 50,000 to 200,000.

Claim 12. The method of Claim 10, wherein the PBSA has a weight average molecular weight from 80,000 to 120,000.

Claim 13. The method of Claim 10, wherein the PBSA has a viscosity from 15,000 to 40,000 centipoise at a temperature of 215 °C.

Claim 14. The method of Claim 10, wherein the PBSA has a melting point from 20 °C to 75 °C.

Claim 15. The method of Claim 10, wherein the PBSA has a melting point from 25 °C to 40 °C.

Claim 16. The method of Claim 10, wherein the composition comprises from 1 to 10 weight percent of the PBSA.

Claim 17. The method of Claim 10, wherein the composition comprises from 50 to 60 weight percent of the PBSA.

Claim 18. The method of Claim 10, 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 19. The method of Claim 10, 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.