components is regulated and controlled, however, in developing countries, burning is often unregulated, increasing the likelihood of brominated dioxin release into the atmosphere.

Summary

In a first aspect, there is provided a composition, comprising:

a phosphorous-containing compound from a reaction of:

at least one organophosphorus compound having a group selected from the group of H-P=O, P-H and P-OH; and

at least one compound having the following Formula (I):

Formula I: $[R'(Y)_{m'}]_m(X - O - R'')_n$

wherein R' is an organic group; Y is a functional group selected from the group of hydroxy, carboxylic acid, carboxylate, acid anhydride, amine, -SH, $-SO_3H$, $-CONH_2$, -NHCOOR phosphinate, phosphate and combinations thereof; X is a hydrocarbylene group; R" is a hydrogen or a hydrocarbyl group having from 1 to 8 carbon atoms, R is alkyl or aryl group having from 1 to 12 carbon atoms; and m', m and n are, independently, numbers equal to or greater than 1;

a cyanate ester; and

an epoxy resin, wherein the phosphorous-containing compound does not contain an aliphatic alcohol, wherein the composition includes an aprotic solvent and wherein the viscosity of the composition increases less than 100% as measured by Gardner Bubble Viscosity at a temperature of 23 °C for at least 3 days.

Embodiments of the present disclosure provide a composition that includes a phosphorous-containing compound, a cyanate ester, and an epoxy resin. For the various embodiments, the composition can also include a maleimide. For the various embodiments, a viscosity of the composition increases less than 100% as measured by Gardner Bubble Viscosity at a temperature of 23 °C in at least 3 days. For the various embodiments, the composition of the present disclosure can also include an aprotic solvent, such as a ketone.

Embodiments of the present disclosure further include a composition that includes the phosphorous-containing compound, the cyanate ester, and the aprotic solvent. For the various embodiments, the composition can also include the epoxy resin and a maleimide. For the various embodiments, a Masterblend compound can be formed with the epoxy resin and the maleimide, where the Masterblend compound can then be used in the composition of the present disclosure.

For the various embodiments, the composition does not include an aliphatic alcohol.

For the various embodiments, the phosphorous-containing compound of the composition is from a reaction of at least one organophosphorus compound having a group selected from the group consisting of H-P=O, P-H and P-OH; and at least one compound having the following Formula (I):

Formula (I) $[R'(Y)_{m'}]_m(X - O - R'')_n$

wherein R' is an organic group; Y is a functional group selected from the group consisting of hydroxy, carboxylic acid, carboxylate, acid anhydride, amine, -SH, -SO_3H, -$CONH_2$, -NHCOOR, phosphinate, phosphate and combinations thereof; X is a hydrocarbylene group; R" is a hydrogen or a hydrocarbyl group having from 1 to 8 carbon atoms, R is alkyl or aryl group having from 1 to 12 carbon atoms; and m', m and n are, independently, numbers equal to or greater than 1.

In a second aspect, there is provided a laminate or prepreg prepared with the composition as defined above.

In a third aspect, there is provided a method of forming a composition, comprising:

removing an aliphatic alcohol from a phosphorous-containing compound from a reaction of:

at least one organophosphorus compound having a group selected from the group of H-P=O, P-H and P-OH; and

at least one compound having the following Formula (I):

Formula I:

$[R'(Y)_{m'}]_m(X - O - R'')_n$ wherein R' is an organic group; Y is a functional group selected from the group of hydroxy, carboxylic acid, carboxylate, acid anhydride, amine, -SH, -SO_3H, -$CONH_2$, -NHCOOR phosphinate, phosphate and combinations thereof; X is a hydrocarbylene group; R" is a hydrogen or a hydrocarbyl group having from 1 to 8 carbon atoms, R is alkyl or aryl group having from 1 to 12 carbon atoms; and m', m and n are, independently, numbers equal to or greater than 1; and

forming a mixture of the phosphorous-containing compound with a cyanate ester in an aprotic solvent.

For the various embodiments, the composition of the present disclosure can be used to prepare a laminate. Additional embodiments of the present disclosure include a method of forming the composition of the present disclosure. For the various