been used as materials for electrical/electronic equipment, such as materials for electrical laminates because of their superiority in heat resistance, chemical resistance, insulation property, dimensional stability, adhesiveness and the like.

For a variety of applications, especially for components of electrical and electronic devices, flame retardants must be added to the formulations to reduce the chance of fire in the event of an electrical failure. Brominated flame retardants currently dominate the market.

With the advent of lead-free solder regulations, the temperature to which electrical laminates are exposed has increased by about 20-40°C to 230-260°C. At these temperatures typical brominated resins are unstable, and may not be suited for lead-free solder applications. Accordingly, there exists a need to achieve thermal stability in epoxy resins while still maintaining toughness and processability.

SUMMARY ~~OF THE INVENTION~~

In ~~a~~none embodiment ~~of the invention~~, there is disclosed a composition comprising, ~~consisting~~ of, or consisting essentially of: a) an epoxy resin; b) a hardener; and c) a stabilizer comprising a metal-containing compound, the metal-containing compound comprising a metal selected from the group consisting of Group 11-13 metals and combinations thereof, wherein the composition is prepared from a halogen-containing compound.

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

a) an epoxy resin;

b) a hardener; and

c) a stabilizer comprising a metal-containing compound, said metal-containing compound comprising a metal selected from the group consisting of Group 11-13 metals and combinations thereof, wherein when the metal is zinc, said metal-containing compound is selected from the group consisting of zinc hydroxide, zinc oxide, zinc dimethyldithiocarbamate, $ZnSnO_3$, Zn_2SiO_4, $ZnMoO_4$, Zn Borate hydrous, ZnF_2 hydrous, $ZnCl_2$, Zn Borate anhydrous, Zn phosphate, $ZnBr_2$ and combinations of any two or more thereof,

wherein said composition is prepared from a halogen-containing compound.

In a second aspect, there is provided a varnish produced from the disclosed composition.

In a third aspect, there is provided a prepreg prepared from the disclosed varnish.

In a fourth aspect, there is provided an electrical laminate prepared from the disclosed varnish.

In a fifth aspect, there is provided a coating prepared from the disclosed varnish.

In a sixth aspect, there is provided a composite prepared from the disclosed varnish.

In a seventh aspect, there is provided a casting prepared from the disclosed varnish.

In an eighth aspect, there is provided an adhesive prepared from the disclosed vanish.

BRIEF DESCRIPTION OF THE FIGURE

Figure 1 is a plot of phr of zinc oxide vs. the T_d for the nano-zinc oxide formulations.

DETAILED DESCRIPTION OF THE INVENTION

In an embodiment of the invention, there is disclosed a composition comprising, consisting of, or consisting essentially of: a) an epoxy resin; b) a hardener; and c) a stabilizer comprising a metal-containing compound, the metal-containing compound comprising a metal selected from the group consisting of Group 11-13 metals and combinations thereof, wherein the composition is prepared from a halogen-containing compound.