ABSTRACT OF THE DISCLOSURE

A significant disadvantage of the use of polylactic acid (PLA) has been overcome by the use of acrylonitrile-butadiene-styrene (ABS) in combination with an epoxy functional styrene-acrylate oligomeric chain extender. The composition also often exceeds a threshold of 65°C in heat deflection temperature. Use of an impact modifier further improves the industrial versatility of the heat resistant PLA composition.

What is claimed is:

1. A heat resistant polylactic acid composition, comprising:

(a) polylactic acid,

(b) acrylonitrile-butadiene-styrene,

(c) an epoxy-functional styrene-acrylic oligomer, and

(d) optionally, impact modifier;

wherein the acrylonitrile-butadiene-styrene or the optional impact modifier is a source of surfactant to facilitate reaction of the oligomer with the polylactic acid, the acrylonitrile-butadiene-styrene, or both;

wherein the composition has polylactic acid as a significant component; and

wherein if the blended composition is essentially dried before shaping into a plastic article, then the blended composition after shaping into the plastic article has a heat deflection temperature increase of at least 5°C more than the heat deflection temperature of the polylactic acid alone, when both are measured at 66 pounds per square inch using the protocol of ASTM D648.

2. The composition of Claim 1, wherein if the blended composition is essentially dried before shaping into a plastic article, then the blended composition after shaping into the plastic article has a heat deflection temperature of at least 65°C at 66 pounds per square inch using the protocol of ASTM D648.

3. The composition of Claim 1 or Claim 2, wherein the acrylonitrile-butadiene-styrene has residual surfactant present therein.

4. The composition of Claim 1 or Claim 2, wherein the polylactic acid and the acrylonitrile-butadiene-styrene are dried before or during being combined.

5. The composition of Claim 1 or Claim 2 or Claim 3, wherein the impact modifier is present and has residual surfactant therein.

6. The composition of Claim 1 or Claim 2, further comprising titanium dioxide.

7. The composition of Claim 1 or Claim 2, wherein the polylactic acid comprises poly-D-lactide, poly-L-lactide, or a combination of both, and wherein the amount of epoxy-functional styrene-acrylic oligomer is present in the composition at less than about 2 weight percent.

8. The composition of any of Claims 3-6, wherein the amount of ABS ranges from about 20 to about 70 weight percent of the total composition, and wherein the amount of epoxy-functional styrene-acrylic oligomer is present in the composition at less than about 2 weight percent.

9. The composition of Claim 1 or Claim 2, the acrylonitrile-butadiene-styrene has from 40-60 weight percent of styrene content, from 5-30 weight percent of butadiene content, and from 15-35 weight percent of acrylonitrile content.

10. The composition of any of Claims 3-7, wherein the acrylonitrile-butadiene-styrene has from 40-60 weight percent of styrene content, from 5-30 weight percent of butadiene content, and from 15-35 weight percent of acrylonitrile content.

11. A plastic article shaped from a blended composition of Claim 1 or Claim 2.

12. The article of Claim 11, wherein the article is molded or extruded and wherein the article is shaped for use in transportation, appliance, electronics, building and construction, packaging, or consumer markets.

13. A plastic article shaped from a blended composition any of Claims 3-10, wherein the plastic article has a heat deflection temperature increase of at least 5°C more than the heat deflection temperature of a plastic article made of polylactic acid alone, when both are measured at 66 pounds per square inch using the protocol of ASTM D648.

14. The article of Claim 13, wherein the article is molded or extruded and wherein the article is shaped for use in transportation, appliance, electronics, building and construction, packaging, or consumer markets.

15. A method of making the composition of any of Claim 1 or Claim 2, comprising the steps of

(a) gathering ingredients including polylactic acid and acrylonitrile-butadiene-styrene having residual surfactants therein and an epoxy functional styrene-acrylate oligomeric chain extender, and

(b) reacting them into a composition for subsequent molding or extruding into a plastic article shaped for use in transportation, appliance, electronics, building and construction, packaging, or consumer markets.

16. The method of making the composition of Claim 15, further comprising the steps of

(c) drying the blended composition to a moisture content of less than 0.1% and

(d) shaping the blended composition into a plastic article for use in transportation, appliance, electronics, building and construction, packaging, or consumer markets.

Dated this 18/04/2012

(HRISHIKESH RAY CHAUDHURY)
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANT[S]

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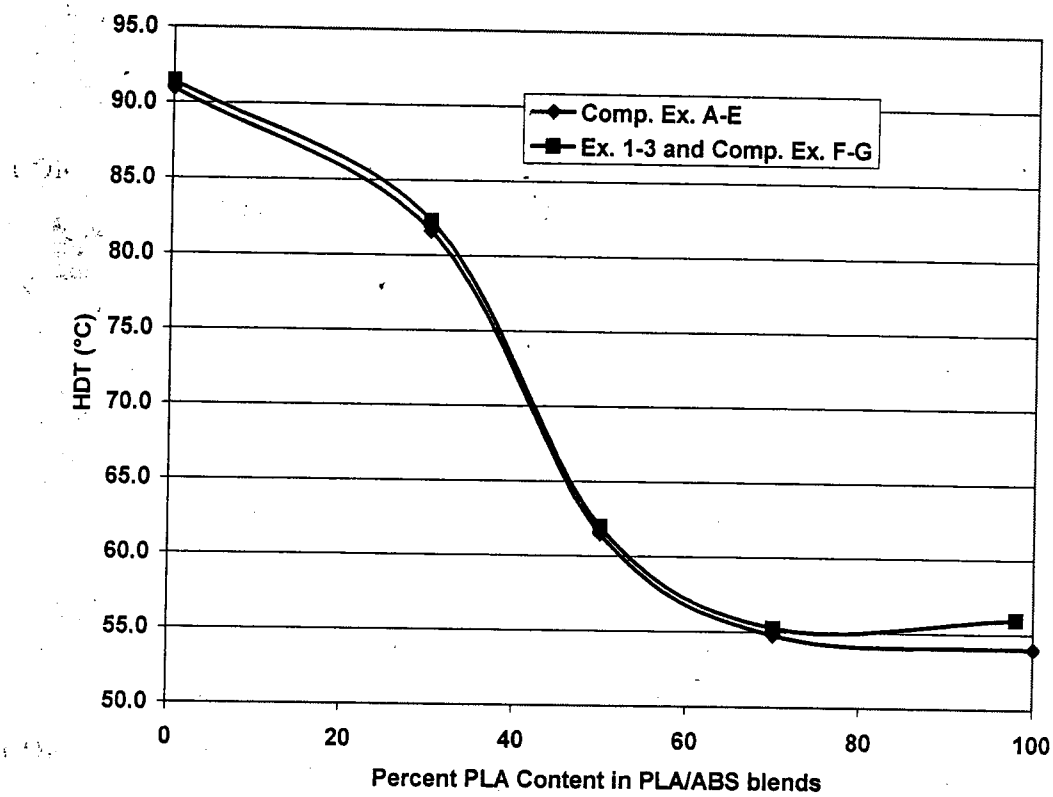
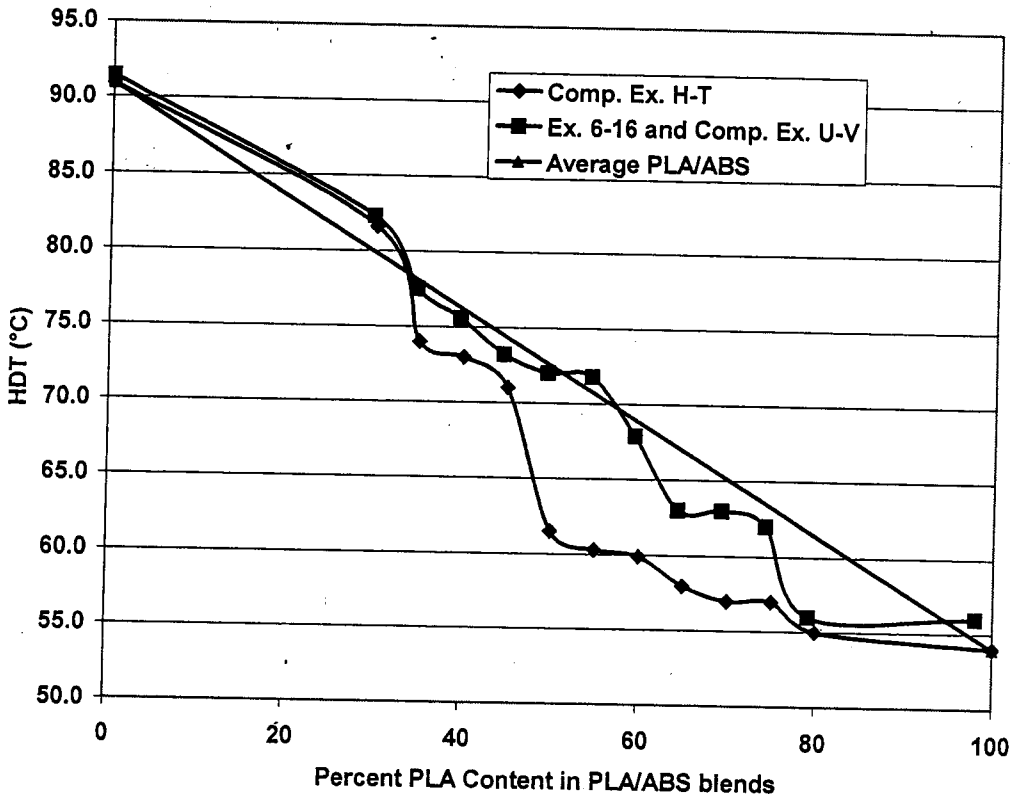
Fig. 1



(HRISHIKESH RAY CHAUDHURY)
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANTS

Fig. 2



(HRISHIKESH RAY CHAUDHURY)
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANTS