What is claimed is:

1. A heat resistant, flame retardant polylactic acid compound, comprising:

(a) polylactic acid;

(b) polyphosphonate-co-carbonate;

(c) core/shell siloxane/(meth)acrylate copolymer impact modifier in an amount of from about 5 to about 12 weight percent of the compound;

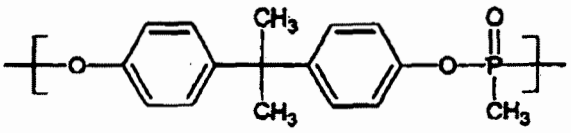
(d) drip suppressant in an amount of from about 0.1 to about 2 weight percent of the compound; and optionally

(e) an oligomeric chain extender.

2. The compound of Claim 1, wherein the polyphosphonate-co-carbonate is formed from at least one phosphonate oligomer or polyphosphonate block covalently linked to polycarbonate, wherein the covalent linkages are between the at least one phosphonate oligomer or polyphosphonate and the polycarbonate to provide a copolymer having a single glass transition temperature (Tg).

3. The compound of Claim 1 or Claim 2, wherein the polyphosphonate-co-carbonate has a weight average molecular weight ranging from about 30,000 to about 50,000; a glass transition temperature ranging from about 120°C to about 133°C; a percentage phosphorus content of about 3.8 to about 6.5 weight percent of the polyphosphonate-co-carbonate; and a Limiting Oxygen Index ranging from about 40% to about 50%.

4. The compound of Claim 3, wherein the phosphonate oligomer or polyphosphonate block has the structure of





AMENDED SHEET (ART. 34)

5. The compound of Claim 4, wherein the polyphosphonate-co-carbonate is a blend of two different polyphosphonate-co-carbonates.

6. The compound of any of Claims 1-5, wherein if the blended compound is essentially dried before shaping into a plastic article, then the blended compound after shaping into the plastic article has a heat deflection temperature of at least 100°C at 66 pounds per square inch using the protocol of ASTM D648.

7. The compound of any of Claims 1-6, wherein the polylactic acid comprises poly-D-lactide, poly-L-lactide, or a combination of both and wherein the amount of polylactic acid is present in the compound ranges from about 30 to about 39 weight percent.

8. The compound of any of Claims 1-7, wherein the oligomeric chain extender is an epoxy-functional styrene-acrylic oligomer, and wherein the amount of epoxy-functional styrene-acrylic oligomer is present in the compound from about 0.5 to about 2 weight percent.

9. The compound of any of Claims 1-8, wherein the drip suppressant is polytetrafluoroethylene.

10. A plastic article shaped from a compound of any of Claims 1-9.

11. The article of Claim 10, 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.



AMENDED SHEET(ART. 34)

12. The article of Claim 9 or Claim 10, wherein the 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.

13. The article of Claim 12, wherein the article has a UL 94 flame retardance of V-0 or V-1 at 3.2 mm thickness.

14. A method of making the compound of any of Claims 1-9, comprising the steps of

(a) gathering ingredients including polylactic acid, polyphosphonate-co-carbonate, impact modifier, and drip suppressant and, optionally, an epoxy functional styrene-acrylate oligomeric chain extender, and

(b) melt-mixing them into a compound for subsequent shaping into a plastic article shaped for use in transportation, appliance, electronics, building and construction, packaging, or consumer markets.

15. The method of making the compound of Claim 14, further comprising the steps of

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

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



AMENDED SHEET(ART. 34)

What is claimed is:

1. A heat resistant, flame retardant polylactic acid compound, comprising:

(a) polylactic acid in an amount of from about 30 to 39 weight percent of the compound;

(b) polyphosphonate-co-carbonate;

(c) core/shell siloxane/(meth)acrylate copolymer impact modifier in an amount of from about 5 to about 12 weight percent of the compound;

(d) drip suppressant in an amount of from about 0.1 to about 2 weight percent of the compound; and optionally

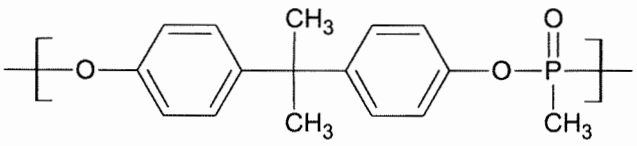
(e) an oligomeric chain extender,

wherein the compound when shaped into a 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.

2. The compound of Claim 1, wherein the polyphosphonate-co-carbonate is in an amount of from about 50 to about 70 weight percent of the compound and is formed from at least one phosphonate oligomer or polyphosphonate block covalently linked to polycarbonate, wherein the covalent linkages are between the at least one phosphonate oligomer or polyphosphonate block and the polycarbonate to provide a copolymer having a single glass transition temperature (Tg).

3. The compound of Claim 1, wherein the polyphosphonate-co-carbonate has a weight average molecular weight ranging from about 30,000 to about 50,000; a glass transition temperature ranging from about 120°C to about 133°C; a percentage phosphorus content of about 3.8 to about 6.5 weight percent of the polyphosphonate-co-carbonate; and a Limiting Oxygen Index ranging from about 40% to about 50%.

4. The compound of Claim 3, wherein the phosphonate oligomer or polyphosphonate block has the structure of



5. The compound of Claim 4, wherein the polyphosphonate-co-carbonate is a blend of two different polyphosphonate-co-carbonates.

6. The compound of Claim 1, wherein if the blended compound is essentially dried before shaping into a plastic article, then the blended compound after shaping into the plastic article has a heat deflection temperature of at least 100°C at 66 pounds per square inch using the protocol of ASTM D648.

7. The compound of Claim 1, wherein the polylactic acid comprises poly-D-lactide, poly-L-lactide, or a combination of both.

8. The compound of Claim 1, wherein the oligomeric chain extender is an epoxy-functional styrene-acrylic oligomer, and wherein the amount of epoxy-functional styrene-acrylic oligomer is present in the compound from about 0.5 to about 2 weight percent.

9. The compound of Claim 1, wherein the drip suppressant is polytetrafluoroethylene.

10. A plastic article shaped from a compound of Claim 1.

11. The article of Claim 10, 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.

12. The article of Claim 10, wherein the article has a UL 94 flame retardance of V-0 or V-1 at 3.2 mm thickness.

13. A method of making the compound of Claim 1, comprising the steps of

(a) gathering ingredients including polylactic acid, polyphosphonate-co-carbonate, impact modifier, and drip suppressant and, optionally, an epoxy functional styrene-acrylate oligomeric chain extender, and

(b) melt-mixing them into a compound for subsequent shaping into a plastic article shaped for use in transportation, appliance, electronics, building and construction, packaging, or consumer markets.

14. The method of making the compound of Claim 13, further comprising the steps of

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

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