CLAIMS

What is claimed:

1. A thermoplastic composition comprising:

   at least one polyamide, present in the thermoplastic composition in an amount of at least 60 wt.% of the thermoplastic composition;

   at least one polyethylene, present in a range of 2 to 30 wt.% of the thermoplastic composition; and

   at least one compatibilizer, present in a range of 0.1 to 10 wt.% of the thermoplastic composition that is a ~~co~~polymer of ethylene and one or more comonomers selected from the group consisting of acrylic ester, glycidyl methacrylate, maleic anhydride, butyl acrylate, ethyl acrylate and functionalized polybutadiene;

   wherein the thermoplastic composition has an Izod Impact energy at 0 °C, as measured by ASTM D256, that is greater than 6 ft-lb./inch, and

   wherein the thermoplastic composition has a bio-based carbon content of at least 50%.

2. The thermoplastic composition of claim 1, wherein the at least one compatibilizer is a copolymer of ethylene and butyl acrylate.

3. The thermoplastic composition of claim 1, wherein the at least one compatibilizer is a maleic anhydride-grafted polyethylene.

4. A thermoplastic composition comprising:

   at least one polyamide present in the thermoplastic composition in an amount of at least 60 wt.% of the thermoplastic composition,

   at least one polyethylene, present in a range of 2 to 30 wt.% of the thermoplastic composition, and

   at least one compatibilizer present in a range of 0.1 to 10 wt.% of the thermoplastic composition that is ~~is~~ a terpolymer of ethylene and at least two comonomers selected from the group consisting of acrylic ester, glycidyl methacrylate, maleic anhydride, butyl acrylate, ethyl acrylate and functionalized polybutadiene; and

   wherein the thermoplastic composition has an Izod Impact energy at 0 °C, as measured by ASTM D256, that is greater than 6 ft-lb./inch.

5. The thermoplastic composition of claim 1 or 4, wherein the at least one compatibilizer is a terpolymer of ethylene, acrylic ester and glycidyl methacrylate.

6. The thermoplastic composition of any claims 4-5, wherein the thermoplastic composition has a biobased carbon content in the range of 5 to 100%.

7. The thermoplastic composition of any of the above claims, wherein the thermoplastic composition exhibits a no-break impact behavior as measured by ASTM D256.

8. The thermoplastic composition of any of the above claims, wherein the at least one polyethylene is present in a range of 14 to 28 wt.% of the thermoplastic composition.

9. The thermoplastic composition of any of the above claims, wherein the at least one compatibilizer is present in a range of 0.5 to 5.0 wt.% of the thermoplastic composition.

10. The thermoplastic composition of any of the above claims, wherein the at least one polyamide is selected from the group consisting of nylon 6, nylon 6,6, nylon 6,9, nylon 6,10, nylon 6,12, nylon 4,6, nylon 11, nylon 12 and nylon 12,12.

11. The thermoplastic composition any of the above claims, wherein the at least one polyethylene is selected from the group consisting of polyethylene homopolymer, copolymers of ethylene and one or more C3-C20 alpha-olefins, ethylene vinyl acetate, ethylene vinyl alcohol, polyethylene based ionomers, high density polyethylene, medium density polyethylene, low density polyethylene, linear low density polyethylene, very low density polyethylene, ultra low density polyethylene, ultrahigh molecular weight polyethylene.

12. The thermoplastic composition of claim 11, wherein the at least one polyethylene is a linear low density polyethylene.

13. The thermoplastic composition of any of the above claims, wherein the at least one polyamide is partially or totally obtained from renewable bio-based carbon sources.

14. The thermoplastic composition of any of the above claims, wherein the polyethylene is partially or totally obtained from renewable bio-based sources.

15. The thermoplastic composition of any of the above claims, wherein the at least one compatibilizer is partially or totally obtained from renewable bio-based sources.

16. The thermoplastic composition of any of the above claim, wherein the composition is prepared by melt blending process.

17. A polymer powder comprising powder granules formed of the thermoplastic composition of any of the above claims.

18. A filament comprising a polymer filament formed of the thermoplastic composition of any of the above claims

19. A manufactured article comprising the thermoplastic composition of any of the above claims 1-16.

20. The manufactured article of claim 19, wherein the article is an injection molded article, a thermoformed article, a film, a foam, a blow molded article, a rotomolded article, an extruded article, a pultruded article, or a printed article.

21. A method, comprising:

melt blending at least one polyamide, at least one polyethylene, and at least one compatibilizer that is a terpolymer of ethylene and at least two comonomers selected from the group consisting of acrylic ester, glycidyl methacrylate, maleic anhydride, butyl acrylate, ethyl acrylate, and functionalized polybutadiene to form the thermoplastic composition of any of the above claims; and

extruding the thermoplastic composition.

22. A method, comprising:

melt blending at least one polyamide, at least one polyethylene, and at least one compatibilizer that is a ~~ter~~polymer of ethylene and at least one comonomer selected from the group consisting of acrylic ester, glycidyl methacrylate, maleic anhydride, butyl acrylate, ethyl acrylate, and functionalized polybutadiene to form the thermoplastic composition of any of the above claims, wherein the thermoplastic composition has a bio-based carbon content of at least 50%; and

extruding the thermoplastic composition.

23. The method of claim 21 or 22, wherein the extruded thermoplastic composition is a polymer powder.

24. The method of claim 21 or 22, wherein the extruded thermoplastic composition is a polymer filament.

25. A method of manufacturing a printed article, comprising:
successively printing layers of the thermoplastic composition of any of claims 1-16.

~~26. A method of manufacturing a printed article, comprising~~
~~successively printing layers of a thermoplastic composition that comprises:~~
~~at least one polyamide; and~~
~~at least one polyethylene.~~

~~27. The method of claim 26, wherein the thermoplastic composition further comprises at least one compatibilizer that is a copolymer of ethylene and one or more comonomers selected from the group consisting of acrylic ester, glycidyl methacrylate, maleic anhydride, butyl acrylate, ethyl acrylate, and functionalized polybutadiene.~~

~~28. The method of any of claims 25-27, wherein the successive printing comprises:~~
~~depositing a layer of powder comprising the thermoplastic composition on a target surface; and~~
~~melting and sintering the thermoplastic composition.~~

~~29. The method of any of claims 25-27, wherein the successive printing comprises:~~
~~successively depositing layers of a molten polymer phase, the molten polymer phase comprising the thermoplastic composition.~~

~~30. The method of claim 29, wherein the method further comprises: melting a polymer filament comprising the thermoplastic composition to form the molten polymer phase.~~

~~31.~~26. An article formed by the method of ~~any of~~ claim~~s~~ 25 ~~to 30~~.

~~32.~~27. An article, comprising:
a plurality of printed layers, at least one of which comprises the thermoplastic composition of any of claims 1 to 16.

~~33. An article, comprising:~~

~~a plurality of printed layers, at least one of which comprises a thermoplastic composition that comprises:~~

~~at least one polyamide; and~~

~~at least one polyethylene.~~

~~34. The article of claim 33, wherein the thermoplastic composition further comprises at least one compatibilizer that is a copolymer of ethylene and one or more comonomers selected from the group consisting of acrylic ester, glycidyl methacrylate, maleic anhydride, butyl acrylate, ethyl acrylate and functionalized polybutadiene.~~