CLAIMS

What is claimed is:

1. A process for preparing a polymer compound, comprising:
   a) providing a mixing device having a hopper and a mixing chamber;

   b) providing a feed composition comprising a melt-processable polypropylene and a carbon black filler; wherein the carbon black filler is present in the feed composition in an amount ranging from 18% to 27% by weight of the feed composition;
   c) supplying the feed composition comprising the melt-processable polypropylene and the carbon black filler to the hopper of the mixing device; and
   d) homogenizing the feed composition to form a molten polymer composition; wherein the melt-processable polypropylene has a melt flow index ranging from 10 g/10 min to 90 g/10 min as measured according to ASTM D1238; wherein homogenizing is carried out at a temperature of 240 °C to 330 °C; thereby forming the polymer compound; wherein the mixing chamber of the mixing device comprises at least one co-rotating double-rotor; and wherein the feed composition is supplied to the hopper of the mixing device at a rate of at least 500 kg/hr.

2. The process of claim 1, further comprising solidifying the molten polymer composition; wherein the carbon black filler retains at least 80% of its structure after solidifying the molten polymer composition, as measured by transmission electron microscopy (TEM) according to ASTM D3849.

3. The process of claim 2, wherein the carbon black filler retains at least 90% of its structure after solidifying the molten polymer composition, as measured by transmission electron microscopy (TEM) according to ASTM D3849.

4. The process of claim 2, wherein the carbon black filler retains at least 95% of its structure after solidifying the molten polymer composition, as measured by transmission electron microscopy (TEM) according to ASTM D3849.

5. The process of claim 2, wherein the molten polymer composition is solidified into pellets of the polymer compound.

6. The process of claim 1, wherein an aggregate of the carbon black filler has an aciniform structure as determined by transmission electron microscopy (TEM).

7. The process of claim 1, wherein the carbon black filler is semi-conductive or conductive.

8. The process of claim 1, wherein the carbon black filler has an oil absorption number (OAN) of at least 100cc/100g as measured according to ASTM D2414-18.

9. The process of claim 1, wherein the carbon black filler has an oil absorption number (OAN) ranging from 100cc/100g to 250cc/100g as measured according to ASTM D2414-18.

10. The process of claim 1, wherein the carbon black filler has an oil absorption number (OAN) ranging from 100cc/100g to 180cc/100g as measured according to ASTM D2414-18.

11. The process of claim 1, wherein the carbon black filler has (a) an oil absorption number (OAN) ranging from 100cc/100g to 180cc/100g as measured according to ASTM D2414-18; (b) a nitrogen surface area (NSA) ranging from 50 m^2/g to 210 m^2/g as measured by ASTM D6556; and (c) a statistical thickness surface area (STSA) ranging from 50 m^2/g to 150 m^2/g as measured by ASTM D6556.

12. The process of claim 1, wherein the carbon black filler has a mean particle size distribution ranging from 20 nm to 60 nm as measured according to ASTM D3849.

13. The process of claim 1, wherein the carbon black filler has a mean particle size distribution ranging from 40 nm to 50 nm as measured according to ASTM D3849.

14. The process of claim 1, wherein the polymer compound is a conductive polymer compound.

15. The process of claim 14, wherein the surface resistivity of an injected-molded chip formed from the conductive polymer compound is 1,000 ohm/square or less as measured on a Loresta-GP MCP-T600 resistivity meter according to ASTM D4496.

16. The process of claim 14, wherein the surface resistivity of an injected-molded chip formed from the conductive polymer compound ranges from 10 ohm/square to 1,000 ohm/square as measured on a Loresta-GP MCP-T600 resistivity meter according to ASTM D4496.

17. The process of claim 14, wherein the surface resistivity of an injected-molded chip formed from the conductive polymer compound ranges from 10 ohm/square to 80 ohm/square as measured on a Loresta-GP MCP-T600 resistivity meter according to ASTM D4496.

18. The process of claim 14, wherein the surface resistivity of an injected-molded chip formed from the conductive polymer compound ranges from 20 ohm/square to 80 ohm/square as measured on a Loresta-GP MCP-T600 resistivity meter according to ASTM D4496.

19. The process of claim 1, wherein the polymer compound has a dispersion index of at least 80 as measured according to ASTM D2663.

20. The process of claim 1, wherein the polymer compound has a dispersion index of at least 90 as measured according to ASTM D2663.

21. The process of claim 1, wherein the polymer compound has a dispersion index of at least 95 as measured according to ASTM D2663.

22. The process of claim 1, wherein the mixing chamber of the mixing device further comprises counter-rotating and non-intermeshing double rotors.

23. The process of claim 22, wherein the counter-rotating and non-intermeshing double rotors are selected from a style 7/7 (#7/#7) rotor combination, a style 7/15 (#7/#15) rotor combination, a style 15/7 (#15/#7) rotor combination, or a style 15/15 (#15/#15) rotor combination.

24. A conductive polymer compound prepared by the method of any one of claims 1-23, wherein the carbon black filler retains at least 80% of its structure, as measured by transmission electron microscopy (TEM) according to ASTM D3849, and wherein the surface resistivity of an injected-molded chip formed from the conductive polymer compound ranges from 10 ohm/square to 80 ohm/square as measured on a Loresta-GP MCP-T600 resistivity meter according to ASTM D4496.