CLAIMS

What is claimed is:

1. A method of forming a thermoplastic polymer film, the method comprising:

melting and subjecting a polymer resin material to shear stresses in a range of 250 kPa to 400 kPa to form a refined resin material and forming the thermoplastic polymer film from the refined resin material, wherein the film is free of microgels having a largest dimension greater than 50 microns, the film has a thickness in a range of 15 microns to 80 microns, and the film has a microgel count in a range of 0 to 0.2 per mm^2 of microgels having the maximum dimension greater than 10 microns.

2. The method according to claim 1 wherein the polymer resin material consists primarily of one or more polyolefins.

3. The method according to claim 1 wherein the polymer resin material consists primarily of polyethylene.

4. The method according to claim 1 further comprising:

mixing the polymer resin material with one or more antioxidants.

5. The method according to claim 1 wherein the polymer resin material is subjected to shear stresses in a range of 300 kPa to 375 kPa to form the refined resin material.

6. The method according to claim 1 further comprising:

extruding and solidifying the refined resin material.

7. The method according to claim 1 wherein the polymer resin material comprises at least a majority by weight of polyethylene, the method further comprising:

mixing the polymer resin material with one or more antioxidants; and

extruding and solidifying the refined resin material.

8. A method of forming a polymer film, the method comprising:

providing a polymer resin material consisting primarily of polyethylene;

mixing the polymer resin material with one or more antioxidants to form a resin material mixture;

melting and subjecting the resin material mixture to shear stresses in a range of 250 kPa to 400 kPa to form a refined resin material; and

extruding the refined resin material to form the polymer film, wherein the film is free of microgels having a largest dimension greater than 50 microns, the film has a thickness in a range of 15 microns to 80 microns, and the film has a microgel count in a range of 0 to 0.2 per mm^2 of microgels having the maximum dimension greater than 10 microns.

9. The method according to claim 8 further comprising:

prior to the action of extruding the refined resin material to form the polymer film, extruding and solidifying the refined resin material, and

melting and subjecting the extruded and solidified refined resin material to shear stresses less than 70 kPa.

10. The method according to claim 8 wherein the shear stresses are in a range of 300 kPa to 375 kPa.

11. The method according to claim 9 wherein the extruded and solidified refined resin material is in the form of extruded pellets.