CLAIMS

What is claimed is:

1. A lubricant composition comprising: a lubricating oil basestock; a lubricant additive comprising one or more of an antioxidant, a corrosion inhibitor, an anti-wear additive, a friction modifier, a dispersant, a detergent, a defoaming agent, an extreme pressure additive, a pour point depressant, and a seal-swelling control agent; and a comb copolymer viscosity modifier made by polymerization comprising at least the following monomers: (a) a hydrogenated polybutadiene-based (alk)acrylate ester macromonomer; (b) a C_3-C_8 alkyl (alk)acrylate ester monomer; and (c) a C_{12}-C_{24} alkyl (alk)acrylate ester monomer, wherein repeat units based on the C_{12}-C_{24} alkyl (alk)acrylate ester monomer comprise at least 21.0 wt % of repeat units of the comb copolymer viscosity modifier, wherein the comb copolymer viscosity modifier exhibits a weight average molecular weight of less than or equal to 625,000 g/mol, as measured by gel permeation chromatography (GPC) at about 35° C. in tetrahydrofuran (THF) using polystyrene standards.

2. The lubricant composition of claim 1, wherein the comb copolymer viscosity modifier comprises substantially no repeat units based on styrene monomer, and wherein repeat units based on the C_{12}-C_{24} alkyl (alk)acrylate ester monomer comprise up to 35.0 wt % of repeat units of the comb copolymer viscosity modifier.

3. The lubricant composition of claim 1, wherein repeat units based on the hydrogenated polybutadiene-based (alk)acrylate ester macromonomer comprise from 7.0 wt % to 18 wt % of the repeat units of the comb copolymer viscosity modifier.

4. The lubricant composition of claim 1, wherein repeat units based on the C_3-C_8 alkyl (alk)acrylate ester monomer comprise from 40 wt % to 71 wt % of the repeat units of the comb copolymer viscosity modifier.

5. The lubricant composition of claim 4, wherein repeat units based on the C_3-C_8 alkyl (alk)acrylate ester monomer comprise from 45 wt % to 64 wt % of the repeat units of the comb copolymer viscosity modifier.

6. The lubricant composition of claim 1, wherein: (i) the C_3-C_8 alkyl (alk)acrylate ester monomer is a butyl acrylate and/or a butyl methacrylate; (ii) the C_{12}-C_{24} alkyl (alk)acrylate ester monomer comprises a lauryl acrylate, a lauryl methacrylate, a myristyl acrylate, a myristyl methacrylate, a palmityl acrylate, a palmityl methacrylate, a heptadecanoyl acrylate, a heptadecanoyl methacrylate, or a combination thereof; or (iii) both (i) and (ii).

7. The lubricant composition of claim 1, comprising from 0.4 mass % to 6.0 mass % of the comb copolymer viscosity modifier, based on the total mass of the lubricant composition.

8. The lubricant composition of claim 1, comprising from 75 mass % to 95 mass % of the lubricating oil basestock, based on the total mass of the lubricant composition, and wherein the lubricating oil basestock comprises a Group I basestock, a Group II basestock, a Group III basestock, or a mixture thereof.

9. The lubricant composition of claim 1, which exhibits at least three of the following characteristics: a high-temperature high-shear viscosity at approximately 150° C. (HTHS150) of at least 2.55 cPs; a high-temperature high-shear viscosity at approximately 100° C. (HTHS100) of at most 5.64 cPs; a high-temperature high-shear viscosity at approximately 80° C. (HTHS80) of at most 8.35 cPs; a KV100 from 6.90 cSt to 9.42 cSt; a kinematic viscosity at approximately 40° C. (KV40) of at most 34.9 cSt; a kinematic viscosity at approximately 20° C. (KV20) of at most 79.0 cSt; and a viscosity index of at least 200.

10. The lubricant composition of claim 1, wherein the comb copolymer viscosity modifier comprises at least 23.0 wt % of repeat units based on the C_{12}-C_{24} alkyl (alk)acrylate ester monomer, and wherein the lubricant composition exhibits at least four of the following characteristics: a high-temperature high-shear viscosity at approximately 150° C. (HTHS150) of at least 2.55 cPs; a high-temperature high-shear viscosity at approximately 100° C. (HTHS100) of at most 5.64 cPs; a high-temperature high-shear viscosity at approximately 80° C. (HTHS80) of at most 8.34 cPs; a KV100 from 7.20 cSt to 9.40 cSt; a kinematic viscosity at approximately 40°

C. (KV40) of at most 34.7 cSt; a kinematic viscosity at approximately 20° C. (KV20) of at most 78.7 cSt; and a viscosity index (VI) of at least 205.

11. The lubricant composition of claim 1, wherein the comb copolymer viscosity modifier is made by polymerization of monomers consisting essentially of: (a) the hydrogenated polybutadiene-based (alk)acrylate ester macromonomer; (b) the C_3-C_8 alkyl (alk)acrylate ester monomer; and (c) the C_{12}-C_{24} alkyl (alk)acrylate ester monomer.

12. The lubricant composition of claim 1, wherein the comb copolymer viscosity modifier: (i) is made by polymerization of monomers that comprise substantially no styrene nor styrenic monomers; and (ii) comprises substantially no styrene-based nor styrenic-based repeat units.

13. The lubricant composition of claim 1, wherein the comb copolymer viscosity modifier is made by polymerization comprising monomers (a), (b), (c), and (d) at least one additional olefinic monomer, different from monomers (a), (b), and (c), and which is not a C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer nor a C_1-C_{18} alkyl-endcapped or C_6-C_{20} aryl-, aralkyl-, or alkaryl-endcapped C_2-C_6 oxyalkyl or C_2-C_6 oligo(alkylene glycol)-based (alk)acrylate ester monomer nor a hydroxyalkyl or H-endcapped oligo(alkylene glycol)-based (alk)acrylate monomer.

14. A method of modifying a viscosity of a lubricant composition comprising: forming a viscosity modified mixture by combining a viscosity modifying amount of a comb copolymer viscosity modifier with one of the following lubricant composition components: (1) a lubricating oil basestock; (2) at least one lubricant additive comprising an antioxidant, a corrosion inhibitor, an anti-wear additive, a friction modifier, a dispersant, a detergent, a defoaming agent, an extreme pressure additive, a pour point depressant, a seal-swelling control agent, or a combination thereof; or (3) a lubricant composition comprising both (1) and (2), the comb copolymer viscosity modifier being made by polymerization comprising at least the following monomers: (a) a hydrogenated polybutadiene-based (alk)acrylate ester macromonomer; (b) a C_3-C_8 alkyl (alk)acrylate ester monomer; and (c) a C_{12}-C_{24} alkyl (alk)acrylate ester monomer, wherein repeat units based on the C_{12}-C_{24} alkyl (alk)acrylate ester

monomer comprise at least 21.0 wt % of repeat units of the comb copolymer viscosity modifier, wherein the comb copolymer viscosity modifier exhibits a weight average molecular weight of less than or equal to 625.000 g/mol, as measured by gel permeation chromatography (GPC) at about 35° C. in tetrahydrofuran (THF) using polystyrene standards, and wherein the viscosity modified mixture exhibits at least a 5% difference, relative to the lubricant composition components (1), (2), or (3) without the comb copolymer viscosity modifier, with regard to one or more of HTHS150, HTHS100, HTHS80, KV100, KV40, KV20, and VI.

15. The method of claim 14, wherein the viscosity modifying amount of the comb copolymer viscosity modifier is from 0.5 mass % to 5.0 mass %, based on the total mass of the viscosity modified mixture, and wherein the lubricating oil basestock comprises a Group I, Group II, and/or Group III basestock.

16. The method of claim 14, wherein the comb copolymer viscosity modifier is combined with (1) the lubricating oil basestock, or (3) the lubricant composition comprising (1) and (2) the at least one lubricant additive, and wherein the 5% difference is thus relative to lubricant composition components (1) or (3).

17. The method of claim 14, wherein the viscosity modified mixture exhibits at least a 5% difference with regard to four or more of the enumerated characteristics.

18. The method of claim 14, wherein the viscosity modified mixture exhibits at least a 10% difference with regard to three or more of the enumerated characteristics.