[0185] For copolymers of Comparative Example 1 and Examples 3-4, 7-9, 12, 14, and 16-20, a portion of each synthesized concentrate was initially set aside and diluted (with Yubase 4) to a target KV100 of approximately 8 cSt. For these additionally diluted samples, compositional KV100 was adjusted to ~8 cSt to measure viscosity index (VI) as a comparative performance indicator. These data plus KV40 are shown in Table 2.

Table 2.

Sample	Monomer Content [Macro/BMA/L1214/BzMA]	KV100 [cSt]	KV40 [cSt]	VI @ KV100 ~8cSt
Ex. 3	15/60/25/0	7.87	26.6	295
Ex. 4	15/60/25[1]/0	7.94	25.2	320
Ex. 7	15/56/25/4	7.99	27.2	293
Ex. 8	15/52/25/8	7.95	26.8	296
Ex. 9	15/48/25/12	8.01	26.5	304
Ex. 12	15/45/25/15	7.91	27.7	282
Ex. 14	15/38/23/24	8.00*	28.5*	271*
Comp. Ex. 1	15/75/10/0	8.01	25.8	315
Ex. 16	15/70/10/5	7.84	27.0	287
Ex. 17	15/65/10/10	7.78	25.3	309
Ex. 18	15/64/21/0	8.05	26.4	308
Ex. 19	15/59/21/5	8.03	26.4	306
Ex. 20	15/52/21/12	7.96	25.7	312

[1] 25 wt% refers to purely lauryl methacrylate (C_{12} only, not mix of C_{12}/C_{14})

* represents extrapolated calculation from least squares fit ($R^2 \approx 0.9992$) from measured samples having KV100 values of 6.01, 6.55, and 8.79, as adjusted to 8.00

Copolymer Syntheses – Examples 23-27

[0186] Regarding Examples 23-25, every aspect of the comb copolymer synthesis was identical to that described above for Examples 18-20, except that naphthyl methacrylate (NMA) was substituted for benzyl methacrylate (BzMA) and the monomer mixture was divided into two portions. A first monomer portion contained a homogenized combination of all the h-PBDMA, all the LMA 1214F, and approximately one-third (~1/3) of the BMA. A second monomer portion contained a homogenized combination of all the NMA and the remaining approximately two-thirds (~2/3) of the BMA. In some cases, the second portion may need to be homogenized at ~115°C. The first and second separately-homogenized monomer portions can then be added together to the reaction mixture, before sparging with nitrogen for ~20-30 minutes. Otherwise, the same initiator and diluent/basestock(s)

were used, and the same copolymerization scheme (all monomers added up front; initiator solution added in thirds; monomer to initiator ratio similar) and reaction times/temperatures were used.

[0187] Regarding Examples 26-27, every aspect of the comb copolymer synthesis was identical to that described above for Examples 7-9, except that benzyl methacrylate (BzMA) was used. Otherwise, the same initiator and diluent(s)/ basestock(s) were used, and the same copolymerization scheme (all monomers added up front; initiator solution added in thirds; monomer to initiator ratio similar) and reaction times/temperatures were used.

[0188] Table 3 shows the relative weight percentages of the various monomers added to the reaction mixture, the Mn and Mw values measured by GPC, the percent conversion (calculated from ^{1}H NMR), and the actual comb copolymer content (in wt%) of the concentrates for Examples 8 and 23-27. The instrument specification and analysis conditions were the same as specified for Comparative Examples 1-2 and Examples 3-22.

Table 3.

Example	Monomer Content [Macro/BMA/L1214/Aryl[2]]	GPC		% Conv	AI (actual)
		Mn	Mw		
Ex. 23	15/50/25/10	62500	122300	96.1	35.6
Ex. 24	12/53/25/10	64100	137800	97.5	36.1
Ex. 25	18/47/25/10	64400	138300	92.5	34.2
Ex. 8	15/52/25/8	121600	357700	97.7	29.2
Ex. 26	15.7/50.3/26.2/7.9	89400	221200	96.6	28.1
Ex. 27	13.6/52.4/26.2/7.9	101500	302700	96.4	28.5

[2] NMA for Examples 23-25, and BzMA for Examples 8 and 26-27

[0189] For copolymers of Examples 8 and 23-27, a portion of each synthesized concentrate was initially set aside and diluted (with Yubase 4) to a target KV100 of approximately 8 cSt. For these additionally diluted samples, compositional KV100 was adjusted to ~8 cSt to measure viscosity index (VI) as a comparative performance indicator. These data plus KV40 are shown in Table 4.

Table 4.

Example	Monomer Content [Macro/BMA/L1214/Aryl[2]]	KV100 [cSt]	KV40 [cSt]	VI @ KV100 ~8cSt
Ex. 23	15/50/25/10	7.71	29.2	253
Ex. 24	12/53/25/10	7.88	29.0	264
Ex. 25	18/47/25/10	7.84	28.5	268
Ex. 8	15/52/25/8	7.95	26.8	296
Ex. 26	15.7/50.3/26.2/7.9	8.20	29.4	276
Ex. 27	13.6/52.4/26.2/7.9	7.96	27.6	285

[2] NMA for Examples 23-25, and BzMA for Examples 8 and 26-27

Copolymer Syntheses – Examples 28-32

[0190] Regarding Examples 28-32, every aspect of the comb copolymer synthesis was identical to that described above for Examples 23-25, which again deviated from Examples 18-20 in that naphthyl methacrylate (NMA) was substituted for benzyl methacrylate (BzMA) and the monomer mixture was divided into two portions. A first monomer portion contained a homogenized combination of all the h-PBDMA, all the LMA 1214F, and approximately one-third (~1/3) of the BMA. A second monomer portion contained a homogenized combination of all the NMA and the remaining approximately two-thirds (~2/3) of the BMA. In some cases, the second portion may need to be homogenized at ~115°C. The first and second separately-homogenized monomer portions can then be added together to the reaction mixture, before sparging with nitrogen for ~20-30 minutes. Otherwise, the same initiator and diluent/basestock(s) were used, and the same copolymerization scheme (all monomers added up front; initiator solution added in thirds; monomer to initiator ratio similar) and reaction times/temperatures were used.

[0191] Table 5 shows the relative weight percentages of the various monomers added to the reaction mixture, the Mn and Mw values measured by GPC, the percent conversion (calculated from ^{1}H NMR), and the actual comb copolymer content of the concentrates for Comparative Example 1 and Examples 3 and 28-32. The instrument specification and analysis conditions were the same as specified for Comparative Examples 1-2 and Examples 3-22.

[0192] For copolymers of Comparative Example 1 and Examples 3, 28-30, and 32, a portion of each synthesized concentrate was initially set aside and diluted (with Yubase 4) to a target KV100 of approximately 8 cSt. For these additionally diluted

samples, compositional KV100 was adjusted to ~8 cSt to measure viscosity index (VI) as a comparative performance indicator. These data plus KV40 are shown in Table 6.

Table 5.

Example	Monomer Content [Macro/BMA/L1214/NMA]	GPC		% Conv	AI (actual)
		Mn	Mw		
Comp. Ex. 1	15/75/10/0	74300	271700	97.8	29.4
Ex. 28	15/70/10/5	96100	283700	99.0	36.6
Ex. 29	15/65/10/10	77900	202600	99.0	36.6
Ex. 30	15/60/10/15	57900	115300	96.3	35.6
Ex. 3	15/60/25/0	105600	336900	96.8	28.8
Ex. 32	15/50/25/10	62500	122300	95.0	37.0

Table 6.

Example	Monomer Content [Macro/BMA/L1214/NMA]	KV100 [cSt]	KV40 [cSt]	VI @ KV100 ~8cSt
Comp. Ex. 1	15/75/10/0	8.01	25.8	315
Ex. 28	15/70/10/5	7.87	25.5	311
Ex. 29	15/65/10/10	8.33	28.5	293
Ex. 30	15/60/10/15	8.06	29.9	263
Ex. 31	15/55/10/20	--	--	--
Ex. 3	15/60/25/0	7.87	26.6	295
Ex. 32	15/50/25/10	7.71	29.2	253

Lubricant Formulations – Comparative Examples 33-34 and Examples 35-52

[0193] The polyalkyl(alk)acrylate comb copolymer concentrates of Comparative Examples 1-2 and Examples 3-9, 10 (twice), 12-15, 21-22, 26-27, and 32 were added in various proportions to finished lubricant compositions of Comparative Examples 33-34 and Examples 35-52, which lubricant compositions also contained at least an additive package concentrate (comprising one or more dispersants, one or more detergents, one or more antiwear components, one or more friction modifiers, one or more antioxidants, a diluent/basestock, and optionally one or more other components), a pour point depressant/flow improver, and a diluent/basestock. In Comparative Examples 33-34 and Examples 35-42 and 44-52, the components and proportions of the additive package concentrate and pour point depressant/flow improver remained constant (at ~13.5 wt% and ~0.2 wt%, respectively), while the chemistry and proportions of the polyalkyl(alk)acrylate comb copolymer viscosity modifiers were

varied (while keeping each sum of the viscosity modifier concentration and the diluent/basestock concentration constant at ~86.3 wt%). In Example 43, the additive package content of the formulation was reduced to ~12.8 wt%, while the pour point depressant/flow improver content remained at ~0.2 wt%, and the remainder (aside from copolymer content, which was enumerated in the table) was diluent/basestock. Table 7 shows these chemistries and proportions, as well as various relevant viscometric characteristics of each finished lubricant composition, such as HTHS150 (in cPs), HTHS100 (in cPs), HTHS80 (in cPs), KV100 (in cSt), KV40 (in cSt), KV20 (in cSt), and VI (dimensionless), and various relevant dispersancy characterizations of each finished lubricant composition, such as non-linear model apparent yield stress (APY) and linear model soot rating.

Table 7.

Sample	VM Conc. [Wt%/Type]	Wt% VM Actual	HTHS 150 / 100 / 80	KV100 / 40 / 20	VI	APY / Soot Rating
Comp 33	3.85/CE1	1.39	2.64 / 5.30 / 8.20	7.13 / 33.2 / 78.5	186	-- / --
Comp 34	4.75/CE2	1.40	2.63 / 5.36 / 8.01	7.20 / 33.4 / 77.7	188	-- / --
Ex. 35	4.60/E3	1.32	2.65 / 5.61 / 8.24	7.80 / 34.0 / 78.6	211	0.90 / 7.6
Ex. 36	4.60/E4	1.34	2.65 / 5.61 / 8.23	7.74 / 33.9 / 78.5	209	-- / --
Ex. 37	4.60/E5	1.34	2.71 / 5.58 / 8.23	8.33 / 34.2 / 78.2	234	0.57 / 12.6
Ex. 38	4.60/E6	1.35	2.66 / 5.51 / --	8.10 / 33.7 / 77.5	227	-- / --
Ex. 39	4.60/E7	1.35	2.65 / 5.53 / 8.15	7.58 / 33.6 / 78.1	204	0.98 / 5.1
Ex. 40	4.65/E8	1.36	2.62 / 5.47 / 8.14	7.55 / 33.4 / 77.7	205	0.52 / 13.1
Ex. 41	4.65/E9	1.37	2.59 / 5.36 / 8.03	7.25 / 33.0 / 77.1	193	0.33 / 27.2
Ex. 42	4.70/E10	1.36	2.61 / 5.26 / --	7.31 / 32.7 / 76.1	199	-- / --
Ex. 43	5.50/E10	1.60	2.62 / 5.23 / 7.68	7.45 / 32.2 / 74.5	210	-- / --
Ex. 44	4.38/E12	1.58	2.63 / 5.47 / --	7.24 / 33.8 / 79.5	186	0.40 / 16.3
Ex. 45	6.70/E13	1.88	2.60 / 5.34 / --	7.26 / 33.5 / 78.4	186	0.00 / 99.4
Ex. 46	4.76/E14	1.68	2.45 / 5.33 / --	7.00 / 33.6 / 79.0	177	0.00 / 104
Ex. 47	7.67/E15	2.19	2.63 / 5.36 / 8.07	7.41 / 33.7 / 78.7	195	-- / --
Ex. 48	4.65/E24	1.31	2.59 / 5.57 / 8.20	7.36 / 33.4 / 77.9	195	-- / --
Ex. 49	4.65/E25	1.33	2.60 / 5.50 / 8.10	7.36 / 33.5 / 77.9	195	-- / --
Ex. 50	4.76/E30	1.76	2.57 / 5.57 / --	7.17 / 33.9 / 79.3	182	0.00 / 97.9
Ex. 51	4.10/E21	1.20	2.61 / 5.29 / --	7.21 / 33.3 / 76.9	189	0.80 / 10.6
Ex. 52	4.65/E22	1.35	2.60 / 5.37 / --	7.37 / 33.6 / 78.2	194	0.66 / 14.1

Lubricant Formulations – Examples 53-56

[0194] The polyalkyl(alk)acrylate comb copolymer concentrates of Examples 6, 10, and 11 (twice) were added in various proportions to finished lubricant compositions of Examples 53-56, which lubricant compositions also contained at least

an additive package concentrate (comprising one or more dispersants, one or more detergents, one or more antiwear components, one or more friction modifiers, one or more antioxidants, a diluent/basestock, and optionally one or more other components), a pour point depressant/flow improver, and a diluent/basestock. Although not critical to the analysis, these formulations were targeted with 0W-12 PCMO specifications in mind. In Examples 53-54, the components and proportions of the additive package concentrate and pour point depressant/flow improver remained constant (at ~12.3 wt% and ~0.1 wt%, respectively), while the chemistry and proportions of the polyalkyl(alk)acrylate comb copolymer viscosity modifiers were varied (while keeping each sum of the viscosity modifier concentration and the diluent/basestock concentration constant at ~87.6 wt%). In Example 55, the additive package content of the formulation was increased to ~12.8 wt%, while the pour point depressant/flow improver content remained at ~0.1 wt% and the sum of the viscosity modifier concentration and the diluent/basestock concentration was ~87.1 wt%. In Example 56, the additive package content of the formulation was further increased to ~14.0 wt%, and no pour point depressant/flow improver was included, such that the sum of the viscosity modifier concentration and the diluent/basestock concentration was ~86.0 wt%. Table 8 shows these chemistries and proportions, as well as various relevant viscometric characteristics of each finished lubricant composition, such as HTHS150 (in cPs), HTHS100 (in cPs), HTHS80 (in cPs), KV100 (in cSt), KV40 (in cSt), KV20 (in cSt), and VI (dimensionless).

Table 8.

Sample	VM Conc. [Wt%/Type]	Wt% VM Actual	HTHS 150 / 100 / 80	KV100 / 40 / 20	VI
Ex. 53	1.72/E6	0.51	2.04 / 4.43 / 6.53	6.00 / 27.0 / 62.7	178
Ex. 54	1.75/E10	0.51	1.99 / 4.41 / 6.52	5.78 / 26.9 / 62.5	165
Ex. 55	1.75/E11	0.50	2.05 / 4.33 / 6.65	5.82 / 27.2 / 63.0	166
Ex. 56	3.15/E11	0.90	1.99 / 4.09 / 6.07	5.62 / 24.2 / 55.2	185

Lubricant Formulation – Example 57

[0195] The polyalkyl(alk)acrylate comb copolymer concentrate of Example 15 was added in proportion to a finished lubricant composition of Example 57, which lubricant composition also contained at least an additive package concentrate (comprising one or more dispersants, one or more detergents, one or more antiwear

components, one or more friction modifiers, one or more antioxidants, a diluent/basestock, and optionally one or more other components), a pour point depressant/flow improver, and a diluent/basestock. Although not critical to the analysis, these formulations were targeted with 5W-30 PCMO specifications in mind. In Example 57, the additive package concentrate, pour point depressant/flow improver, polyalkyl(alk)acrylate comb copolymer viscosity modifier, and diluent(s)/ basestock(s) in relative proportions of ~14.7 wt%, ~0.2 wt%, ~11.3 wt%, and ~73.8 wt%, respectively). Table 9 shows these chemistry and proportions, as well as various relevant viscometric characteristics of the finished lubricant composition, such as HTHS150 (in cPs), HTHS100 (in cPs), HTHS80 (in cPs), KV100 (in cSt), KV40 (in cSt), KV20 (in cSt), and VI (dimensionless).

Table 9.

Sample	VM Conc. [Wt%/Type]	Wt% VM Actual	HTHS 150 / 100 / 80	KV100 / 40 / 20	VI
Ex. 57	11.3/E15	3.23	3.53 / 7.34 / 11.5	11.0 / 55.6 / 141	193

[0196] The disclosures of all patents, articles and other materials described herein are hereby incorporated, in their entirety, into this specification by reference. A description of a composition comprising, consisting of, or consisting essentially of multiple specified components, as presented herein and in the appended claims, should be construed to also encompass compositions made by admixing said multiple specified components. The principles, preferred embodiments and modes of operation of the present invention have been described in the foregoing specification. What applicants submit is their invention, however, is not to be construed as limited to the particular embodiments disclosed, since the disclosed embodiments are regarded as illustrative rather than limiting. Changes may be made by those skilled in the art without departing from the spirit of the invention.

CLAIMS

What is claimed is:

1. A lubricant composition comprising:

a lubricating oil basestock;

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; 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;

(c) a C_{12}-C_{24} alkyl (alk)acrylate ester monomer; and

(d) a C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer,

wherein a sum of repeat units based on the C_{12}-C_{24} alkyl (alk)acrylate ester monomer plus the C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer collectively comprise at least 21.0 wt% of repeat units of the comb copolymer viscosity modifier.

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 from 5.0 wt% to 35.0 wt% of repeat units of the comb copolymer viscosity modifier.

3. The lubricant composition of claim 1 or claim 2, wherein repeat units based on the C_{12}-C_{24} alkyl (alk)acrylate ester monomer comprise at least 10.0 wt% of the repeat units of the comb copolymer viscosity modifier, and wherein repeat units based on the C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer comprise at least 11.0 wt% of repeat units of the comb copolymer viscosity modifier.

4. The lubricant composition of any one of the previous claims, wherein:

(i) 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;

(ii) repeat units based on the C_3-C_8 alkyl (alk)acrylate ester monomer comprise from 33 wt% to 64 wt% of the repeat units of the comb copolymer viscosity modifier; or

(iii) both (i) and (ii).

5. The lubricant composition of any one of the previous claims, wherein repeat units based on the C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer comprise from 3.0 wt% to 27 wt% of the repeat units of the comb copolymer viscosity modifier.

6. The lubricant composition of any one of the previous claims, 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 any one of the previous claims, wherein the C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer comprises a benzyl acrylate, a benzyl methacrylate, a naphthyl acrylate, a naphthyl methacrylate, a phenyl acrylate, a phenyl methacrylate, a toluyl acrylate, a toluyl methacrylate, a phenylethyl acrylate, a phenylethyl methacrylate, a nonylnaphthyl acrylate, a nonylnaphthyl methacrylate, an anthracenyl acrylate, an anthracenyl methacrylate, a phenanthrenyl acrylate, a phenanthrenyl methacrylate, a fluorenyl acrylate, a fluorenyl methacrylate, an ethylfluorenyl acrylate, an ethylfluorenyl methacrylate, or a combination thereof.

8. The lubricant composition of any one of the previous claims, comprising from 0.8 mass% to 8.0 mass% of the comb copolymer viscosity modifier, based on the total mass of the lubricant composition.

9. The lubricant composition of any one of the previous claims, 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.

10. The lubricant composition of any one of the previous claims, which exhibits:

a non-linear model applied yield stress (APY) value of at most 0.35 Pa and/or a linear model soot rating of at least 25; and

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 5.60 cPs;

a high-temperature high-shear viscosity at approximately 80°C (HTHS80) of at most 8.30 cPs;

a KV100 from 6.80 cSt to 9.00 cSt;

a kinematic viscosity at approximately 40°C (KV40) of at most 35.0 cSt;

a kinematic viscosity at approximately 20°C (KV20) of at most 79.5 cSt; and

a viscosity index of at least 175.

11. The lubricant composition of any one of the previous claims, wherein the comb copolymer viscosity modifier comprises at least 23.0 wt% of a sum of repeat units based on the C_{12}-C_{24} alkyl (alk)acrylate ester monomer and of repeat units based on the C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer, 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 lubricant composition exhibits:

a non-linear model applied yield stress (APY) value of at most 0.35 Pa and/or a linear model soot rating of at least 25; and

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 5.58 cPs;

a high-temperature high-shear viscosity at approximately 80°C (HTHS80) of at most 8.25 cPs;

a KV100 from 6.90 cSt to 8.50 cSt;

a kinematic viscosity at approximately 40°C (KV40) of at most 34.5 cSt;

a kinematic viscosity at approximately 20°C (KV20) of at most 79.0 cSt; and

a viscosity index (VI) of at least 180.

12. The lubricant composition of any one of the previous claims, 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;

(c) the C_{12}-C_{24} alkyl (alk)acrylate ester monomer; and

(d) the C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer.

13. The lubricant composition of any one of the previous claims, 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.

14. The lubricant composition of any one of claims 1-11 and 13, wherein the comb copolymer viscosity modifier is made by polymerization comprising monomers (a), (b), (c), (d), and (e) at least one additional olefinic monomer, different from monomers (a), (b), (c), and (d) and which is not 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.

15. A method of modifying a viscosity and a dispersancy of a lubricant composition comprising:

forming a viscosity and dispersancy modified mixture by combining a viscosity and dispersancy modifying amount of a comb copolymer viscosity modifier with one of the following lubricant composition components:

(1) a lubricating oil basestock comprising at least 75% by weight of one or more basestocks;

(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;

(c) a C_{12}-C_{24} alkyl (alk)acrylate ester monomer; and

(d) a C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer, wherein a sum of repeat units based on the C_{12}-C_{24} alkyl (alk)acrylate ester monomer plus the C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer collectively comprise at least 21.0 wt% of repeat units of the comb copolymer viscosity modifier, and

wherein the viscosity and dispersancy modified mixture exhibits:

(i) at least a 25% improvement, relative to the lubricant composition components (1), (2), or (3) without the comb copolymer viscosity modifier, with regard to soot dispersancy; and

(ii) 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 (or two or more or three or more or four or more or five or more or six or more or all seven) of HTHS150, HTHS100, HTHS80, KV100, KV40, KV20, and VI.

16. The method of claim 15, wherein the viscosity and dispersancy modifying amount of the comb copolymer viscosity modifier is from 1.0 mass% to 7.0 mass%, based on the total mass of the viscosity modified mixture, and wherein the one or more basestocks comprises a Group I, Group II, and/or Group III basestock.

17. The method of claim 15 or claim 16, 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 25% improvement and 5% difference are thus relative to lubricant composition components (1) or (3).

18. The method of any one of claims 15-17, wherein the viscosity and dispersancy modified mixture exhibits at least a 33% improvement with regard to a non-linear model applied yield stress measurement of soot dispersancy and at least a 5% difference with regard to four or more (or five or more or six or more or all seven) of the enumerated viscometric characteristics.

19. The method of any one of claims 15-18, wherein the viscosity modified mixture exhibits at least a 33% improvement with regard to a non-linear model applied yield stress measurement of soot dispersancy and at least a 10% difference with regard to three or more (or four or more or five or more or six or more or all seven) of the enumerated viscometric characteristics.

20. Use of a comb copolymer viscosity modifier to modify a viscosity and a dispersancy of a lubricant composition, wherein the comb copolymer viscosity modifier is 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;

(c) a C_{12}-C_{24} alkyl (alk)acrylate ester monomer; and

(d) a C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer,

wherein a sum of repeat units based on the C_{12}-C_{24} alkyl (alk)acrylate ester monomer plus the C_6-C_{20} aryl, aralkyl, or alkaryl (alk)acrylate ester monomer collectively comprise at least 21.0 wt% of repeat units of the comb copolymer viscosity modifier, and

wherein the comb copolymer viscosity modifier is combined with one of the following lubricant composition components:

(1) a lubricating oil basestock comprising at least 75% by weight of one or more basestocks;

(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),

to form a viscosity and dispersancy modified mixture, which exhibits:

(i) at least a 25% improvement, relative to the lubricant composition components (1), (2), or (3) without the comb copolymer viscosity modifier, with regard to soot dispersancy; and

(ii) 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 (or two or more or three or more or four or more or five or more or six or more or all seven) of HTHS150, HTHS100, HTHS80, KV100, KV40, KV20, and VI.

21. The method or use according to any one of claims 15-20, wherein the comb copolymer viscosity modifier and the lubricant composition, if applicable, are as described in any one of claims 1-14.