CLAIMS

WHAT IS CLAIMED IS:

1. A viscosity modifier (VM) concentrate comprising:

from 60 parts to 90 parts of a diluent oil; and

from 10 parts to 40 parts of a linear triblock copolymer characterized by the formula:

D'-PA-D'';

wherein D' represents a block derived from diene, PA represents a block derived from monoalkenyl arene and having a number average molecular weight from 20,000 Daltons to 36,000 Daltons, D'' represents a block derived from diene, and the linear triblock copolymer is present in an amount effective to modify a lubricating kinematic viscosity at approximately 100℃ (KV100) of the concentrate,

wherein the concentrate comprises at least 50 wt% of the diluent oil and the effective amount of the linear triblock copolymer is such that the concentrate comprises at least 9.5 wt% of the linear triblock copolymer, and

wherein a KV100 of the diluent oil is from 2 cSt to 40 cSt, the KV100 of the concentrate is 3000 cSt or less.

2. A concentrate according to claim 1, wherein the D' and D'' dienes each individually comprise butadiene, isoprene, and mixtures thereof, but are not identical to each other, and wherein the D' and D'' blocks are substantially hydrogenated after polymerization.

3. A concentrate according to claim 1, wherein the D' and D'' dienes each individually comprise:

(i) not more than 3 wt% butadiene;

(ii) at least 97 wt% isoprene;

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

4. A concentrate according to claim 1, wherein D' has a number average molecular weight from 62,000 Daltons to 150,000 Daltons, PA has a number average molecular weight from 15,000 Daltons to 50,000 Daltons,

and D'' has a number average molecular weight from 5,000 to 80,000 daltons.

5. A concentrate according to claim 4, wherein:

(i) D’ has a number average molecular weight from 63,000 Daltons to 95,000 Daltons.

6. A concentrate according to claim 4, wherein a ratio of PA number average molecular weight to a sum of D’ + D” number average molecular weight is from 0.25 to 0.50.

7. A concentrate according to claim 4, wherein a ratio between the number average molecular weight of D’ and the number average molecular weight of D’’ is from 1.01:1 to 1.25:1 or from 6.00:1 to 20.0:1.

8. A concentrate according to claim 1, wherein the diluent oil comprises a Group II, Group III, and/or Group IV basestock.

9. A concentrate according to claim 1, wherein the KV100 of the concentrate is from 100 cSt to 1600 cSt.

10. A concentrate according to claim 1, wherein the KV100 of the concentrate is 1000 cSt or less.

11. A concentrate according to claim 1, further comprising one or more of an ashless dispersant, a detergent, an anti-wear agent, an antioxidant, a corrosion inhibitor, a friction modifier, an antifoamant, a seal-swelling control agent, or a combination thereof.

12. A VM concentrate comprising:

from 60 parts to 90 parts of a diluent oil; and

from 10 parts to 40 parts of a linear triblock copolymer characterized by the formula:

D’-PA-D’’;

wherein D’ represents a block derived from diene, PA represents a block derived from monoalkenyl arene and having a number average molecular weight from 20,000 Daltons to 36, 000 Daltons, D’’ represents a block derived from diene, and the linear triblock copolymer exhibits a thickening efficiency span of at most 0.5 and is present in an amount effective to modify a lubricating kinematic viscosity at approximately 100°C (KV100) of the concentrate,

wherein the concentrate comprises at least 50 wt% of the diluent oil, and

wherein the KV100 of the diluent oil is from 2 cSt to 40 cSt and the KV100 of the concentrate is 3000 cSt or less.

13. A concentrate according to claim 12, wherein the D’ and D’’ dienes each individually comprise butadiene, isoprene, and mixtures thereof, but are not identical to each other, and wherein the D’ and D’’ blocks are substantially hydrogenated after polymerization.

14. A concentrate according to claim 13, wherein D’ has a number average molecular weight from 30,000 Daltons to 95,000 Daltons, D’’ has a number average molecular weight from 1,800 to 60,000 daltons, and a ratio between the number average molecular weight of D’ and the number average molecular weight of D’’ is from 1.0:1 to 30:1.

15. A concentrate according to claim 12, wherein the linear triblock copolymer exhibits an average thickening efficiency in Group III diluent oil of at least 1.8.

16. A concentrate according to claim 12, wherein the diluent oil comprises a Group II, Group III, and/or Group IV basestock.

17. A concentrate according to claim 16, wherein the diluent oil comprises a Group II and/or Group III basestock.

18. A concentrate according to claim 12, wherein the KV100 of the concentrate is from 100 cSt to 1600 cSt.

19. A concentrate according to claim 12, further comprising one or more of an ashless dispersant, a detergent, an anti-wear agent, an antioxidant, a corrosion inhibitor, a friction modifier, an antifoamant, a seal-swelling control agent, or a combination thereof.

20. A method of modifying the kinematic viscosity at approximately 100°C (KV100) of the VM concentrate of claim 1, the method comprising adding to the concentrate an effective amount of the linear triblock copolymer characterized by the formula:

D'-PA-D'';

wherein D' represents the block derived from diene, PA represents the block derived from monoalkenyl arene, D'' represents the block derived from diene, and the effective amount of the linear triblock copolymer comprises at least 6.0 wt% of the concentrate while the KV100 of the concentrate is 2000 cSt or less.

21. A method of modifying the kinematic viscosity at approximately 100°C (KV100) of the concentrate of claim 12, the method comprising adding to the concentrate an effective amount of the linear triblock copolymer characterized by the formula:

D'-PA-D'';

wherein D' represents the block derived from diene, PA represents the block derived from monoalkenyl arene, D'' represents the block derived from diene, and the effective amount of the linear triblock copolymer comprises at least 9.5 wt% of the concentrate while the KV100 of the concentrate is 3000 cSt or less.

22. A method of modifying the kinematic viscosity at approximately 100°C (KV100) of the VM concentrate of claim 12, the method comprising adding to the concentrate an effective amount of the linear triblock copolymer characterized by the formula:

D'-PA-D'';

wherein:

D' represents the block derived from diene;

PA represents the block derived from monoalkenyl arene;

D'' represents the block derived from diene;

the linear triblock copolymer exhibits a thickening efficiency span of at most 0.5; and

the KV100 of the concentrate containing the effective amount of the linear triblock copolymer is 2000 cSt or less.