CLAIMS

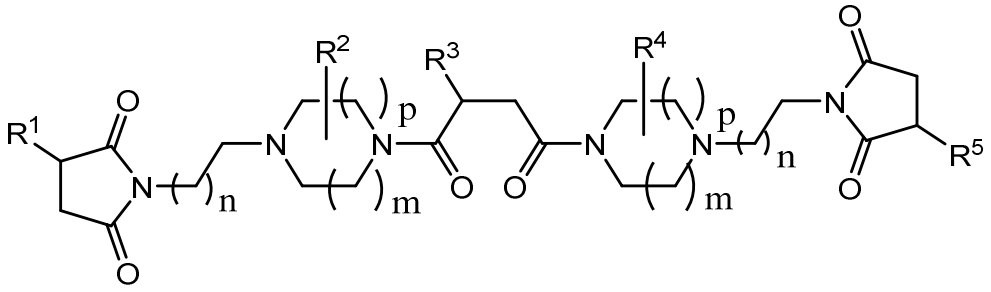
1. A lubricating oil composition comprising:

a) major amount of a base oil; and

b) minor amount of a synergistic friction modifier composition comprising:

i) a molybdenum containing compound; and

ii) a tertiary amine-containing compound having the following structure:



wherein each R^1 and R^5 is independently a linear or branched-chain monovalent hydrocarbyl group having one to twenty carbon atoms, wherein each R^2, R^3, and R^4 is independently a hydrogen, a linear or branched-chain monovalent hydrocarbyl group having one to twenty carbon atoms, each m is independently from 0 to 4, each p is independently from 0 to 4, for each cyclic moiety m + p is from 2 to 4, and each n is independently from 1 to 6.

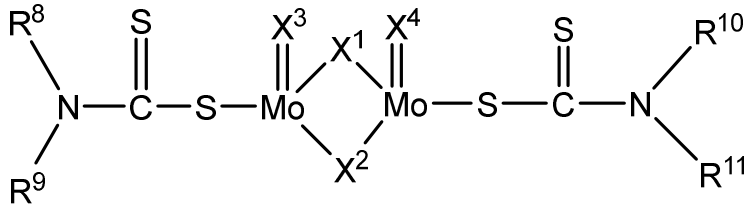
2. The lubricating oil composition of claim 1, wherein the linear or branched-chain monovalent hydrocarbyl group is:

(i) a branched C_{12} to C_{20} alkenyl group or

(ii) a C_{18} to C_{20} alkenyl group.

3. The lubricating oil composition of claim 1, wherein the tertiary amine-containing compound is present in 0.1 to 2 wt% by weight of the lubricating oil composition.

4. The lubricating oil composition of claim 1, wherein the molybdenum containing compound is a molybdenum dithiocarbamate, molybdenum dithiophosphate, molybdenum carboxylate, molybdenum ester, molybdenum amine, or molybdenum amide, optionally wherein the molybdenum dithiocarbamate is given by the following structure:



wherein R^8, R^9, R^{10}, and R^{11} are each independently hydrogen or a hydrocarbon group including, by way of example, alkyl groups, alkenyl groups, aryl groups, cycloalkyl groups and cycloalkenyl groups, and X^1, X^2, X^3 and X^4 are each independently sulfur or oxygen.

5. The lubricating oil composition of claim 1, wherein the molybdenum containing compound is present in the lubricating oil composition in concentration ranging from 50 to 1500 ppm.

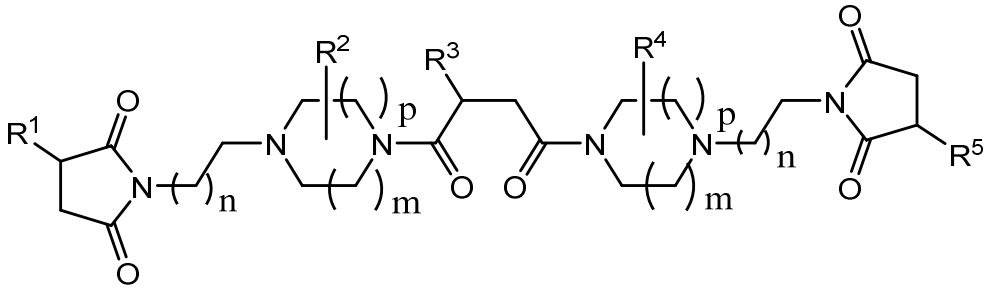
6. A method of modifying friction comprising lubricating an engine with a lubricating oil comprising:

a) major amount of base oil; and

b) minor amount of a synergistic friction modifier composition comprising:

i) a molybdenum containing compound; and

ii) a tertiary amine-containing additive having the following structure:



wherein each R^1 and R^5 is independently a linear or branched-chain monovalent hydrocarbyl group having one to twenty carbon atoms, wherein each R^2, R^3, and R^4 is independently a hydrogen, a linear or branched-chain monovalent hydrocarbyl group having one to twenty carbon atoms, each m is independently from 0 to 4, each p is independently from 0 to 4, for each cyclic moiety m + p is from 2 to 4, and each n is independently from 1 to 6.

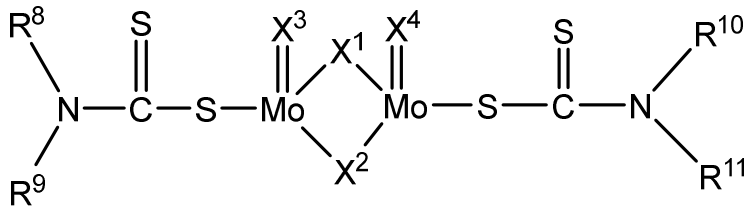
7. The method of claim 6, wherein the linear or branched-chain monovalent hydrocarbyl group is a branched C_{12} to C_{20} alkenyl group.

8. The method of claim 6, wherein the linear or branched-chain monovalent hydrocarbyl group is a branched C_{18} to C_{20} alkenyl group.

9. The method of claim 6, wherein the tertiary amine-containing additive is present in 0.1 to 2 wt% by weight of the lubricating oil composition.

10. The method of claim 6, wherein the molybdenum containing compound is a molybdenum dithiocarbamate, molybdenum dithiophosphate, molybdenum carboxylate, molybdenum ester, molybdenum amine, or molybdenum amide,

11. The method of claim 10, wherein the molybdenum dithiocarbamate is given by the following structure:



wherein R^8, R^9, R^{10}, and R^{11} are each independently hydrogen or a hydrocarbon group including, by way of example, alkyl groups, alkenyl groups, aryl groups, cycloalkyl groups and cycloalkenyl groups, and X^1, X^2, X^3 and X^4 are each independently sulfur or oxygen.

12. The method of claim 6, wherein the molybdenum containing compound is present in the lubricating oil composition in concentration ranging from 50 to 1500 ppm.

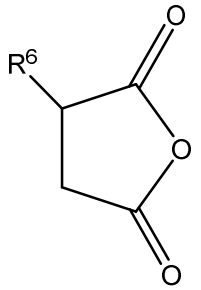
13. A lubricating oil composition comprising:

a) major amount of a base oil;

b) a molybdenum containing compound; and

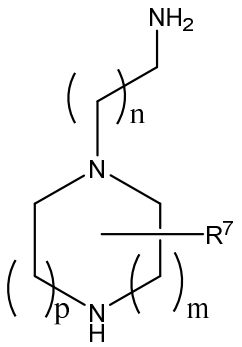
c) a product of a reaction comprising:

i) a hydrocarbyl-substituted succinic anhydride represented by the following structure:



wherein R^6 is a linear or branched-chain monovalent hydrocarbyl group having one to twenty carbon atoms; and

ii) a cyclic polyamine represented by the following structure:

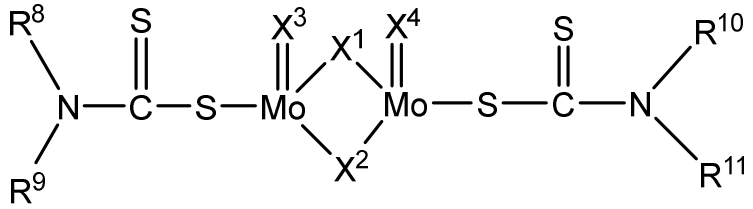


wherein R^7 is hydrogen or a linear or branched-chain monovalent hydrocarbyl group having one to twenty carbon atoms, m is from 0 to 4, p is from 0 to 4, m + p is from 2 to 4, and n is from 1 to 6; and

wherein the hydrocarbyl-substituted succinic anhydride to cyclic polyamine charge mole ratio is from 1.5:1 to 1.6:1.

14. The lubricating oil composition of claim 13, wherein the cyclic amine is aminoethyl piperazine, aminopropyl piperazine, aminobutyl piperazine, aminoethyl diazepane, or aminoethyl diazocane.

15. The lubricating oil composition of claim 13, wherein the molybdenum containing compound is a molybdenum dithiocarbamate, molybdenum dithiophosphate, molybdenum carboxylate, molybdenum ester, molybdenum amine, or molybdenum amide, optionally , wherein the molybdenum dithiocarbamate is given by the following structure:



wherein R^8, R^9, R^{10}, and R^{11} are each independently hydrogen or a hydrocarbon group including, by way of example, alkyl groups, alkenyl groups, aryl groups, cycloalkyl

groups and cycloalkenyl groups, and X^1, X^2, X^3 and X^4 are each independently sulfur or oxygen.

16. The lubricating oil composition of claim 13, wherein the molybdenum containing compound is present in the lubricating oil composition in concentration ranging from 50 to 1500 ppm.