(c) zinc dihydrocarbyl dithiophosphate; and

(d) a hydrocarbyl soluble dispersant.

[0005] In a further embodiment, the hydrocarbyl soluble dispersant is a functionalized dispersant comprising a reaction product of (i) a hydrocarbyl-dicarboxylic acid or anhydride, (ii) a polyamine, (iii) a dicarboxyl-containing fused aromatic compound or anhydride thereof, and optionally, (iv) a non-aromatic dicarboxylic acid or anhydride, wherein the hydrocarbyl group of the hydrocarbyl-dicarboxylic acid or anhydride has a number average molecular weight of greater than 1800 Daltons as determined by gel permeation chromatography.

[0006] In a further embodiment, the functionalized dispersant comprises a reaction product of (i) a hydrocarbyl-dicarboxylic acid or anhydride, (ii) a polyamine, (iii) 1,8-naphtahlic anhydride, and optionally, (iv) a non-aromatic dicarboxylic acid or anhydride.

[0006a] In one aspect, there is provided a crankcase lubricant for a compression-ignited engine, the lubricant comprising:

(a) a base oil;

(b) oleamide;

(c) zinc dihydrocarbyl dithiophosphate; ~~and~~

(d) a functionalized dispersant comprising a reaction product of (i) a hydrocarbyl-dicarboxylic acid or anhydride, (ii) a polyamine, (iii) a dicarboxyl-containing fused aromatic compound or anhydride thereof, and optionally, (iv) a non-aromatic dicarboxylic acid or anhydride, wherein the hydrocarbyl group of the hydrocarbyl-dicarboxylic acid or anhydride has a number average molecular weight of greater than 1800 Daltons as determined by gel permeation chromatography; and

(e) one or more hydrocarbyl substituted succinimide dispersants other than component (d), wherein the hydrocarbyl substituent of component (e) is derived from a polyolefin having a number average molecular weight ranging from about 950 to about 3000 Daltons as determined by gel permeation chromatography and wherein a weight ratio of (e) to (d) in the lubricant ranges from about 1:1 to about 1:10.

[0006b] In another aspect, there is provided a crankcase lubricant for a compression-ignited engine, the lubricant comprising:

(a) a base oil;

(b) from about 0.04 to about 0.2 wt.% oleamide based on a total weight of the lubricant;

(c) zinc dihydrocarbyl dithiophosphate; and

(d) a hydrocarbyl dispersant, wherein the hydrocarbyl dispersant comprises (1) a functionalized dispersant comprising a reaction product of (i) a hydrocarbyl-dicarboxylic acid or anhydride, (ii) a polyamine, (iii) a dicarboxyl-containing fused aromatic compound or anhydride thereof, and optionally, (iv) a non-aromatic dicarboxylic acid or anhydride, wherein the hydrocarbyl group of the hydrocarbyl-dicarboxylic acid or anhydride has a number average molecular weight of greater than 1800 Daltons as determined by gel permeation chromatography; and (2) one or more hydrocarbyl substituted succinimide dispersants other than component (1), wherein the hydrocarbyl substituent of component (2) is derived from a polyolefin having a number average molecular weight ranging from about 950 to about 3000 Daltons as determined by gel permeation chromatography and wherein a weight ratio of (1) to (2) in the lubricant ranges from about 1:1 to about 1:10.

[0007] In a further embodiment, the functionalized dispersant comprises a reaction product of (i) a hydrocarbyl-dicarboxylic acid or anhydride, (ii) a polyamine, (iii) 1,8-naphtahlic anhydride, and optionally, (iv) a non-aromatic dicarboxylic acid or anhydride.

[0008] In another embodiment, the functionalized dispersant comprises a reaction product of (i) a polyisobutenyl succinic acid or anhydride, component, (ii) a polyamine, (iii) 1,8-naphthalic anhydride, and (iv) comprises maleic anhydride.

[0009] In another embodiment, the polyisobutenyl group of component (d) is derived from polyisobutylene having greater than 50 mole percent terminal vinylidene content.

[00010] The another embodiment, from about 0.25 to about 1.5 moles of component (iv) are reacted per mole of component (ii).

[00011] In a further embodiment, the lubricant composition further comprises (e) one or more hydrocarbyl substituted succinimide dispersants other than component (d), wherein the hydrocarbyl substituent of component (e) is derived from a polyolefin having a number average molecular weight ranging from about 950 to about 3000 Daltons as determined by gel permeation chromatography and wherein a weight ratio of (e) to (d) in the lubricant ranges from about 1:1 to about 1:10.

[00012] In another embodiment of the disclosure, zinc dihydrocarbyl dithiophosphate is derived from all primary alcohols; all secondary alcohols; a mixture of primary and secondary alcohols, or a mixture of zinc dihydrocarby dithiophosphates derived from primary and secondary alcohols, wherein the mole percent of primary alcohols in the mixture of alcohols or

a number average molecular weight of greater than 1800 Daltons as determined by gel permeation chromatography.

[00021a] Another aspect of the disclosure provides a method for reducing wear in a compression-ignited engine, the method comprising: (1) lubricating the engine with a crankcase lubricant comprising:

(a) a base oil;

(b) oleamide;

(c) a zinc dithydrocarbyl dithiophosphate; and

(d) a functionalized dispersant comprising a reaction product of (i) a hydrocarbyl-dicarboxylic acid or anhydride, (ii) a polyamine, (iii) a dicarboxyl-containing fused aromatic compound or anhydride thereof, and optionally, (iv) a non-aromatic dicarboxylic acid or anhydride, wherein the hydrocarbyl group of the hydrocarbyl-dicarboxylic acid or anhydride has a number average molecular weight of greater than 1800 Daltons as determined by gel permeation chromatography; and

(e) one or more hydrocarbyl substituted succinimide dispersants other than component (d), wherein the hydrocarbyl substituent of component (e) is derived from a polyolefin having a number average molecular weight ranging from about 950 to about 3000 Daltons as determined by gel permeation chromatography and wherein a weight ratio of (e) to (d) in the lubricant ranges from about 1:1 to about 1:10

[00022] A further aspect of the disclosure provides a method for reducing wear in a compression-ignited engine, the method comprising (1) lubricating the engine with a lubricant comprising: (a) a base oil; (b) from about 0.04 to about 0.2 wt.% oleamide based on a total weight of the lubricant; (c) zinc dihydrocarbyl dithiophosphate in an amount sufficient to provide from about 200 to about 1100 ppm by weight of phosphorus based on the total weight of the lubricant; and (d) from about 2 to about 7 wt% of a hydrocarbyl soluble dispersant based on the total weight of the lubricant.

[00022a] A further aspect of the disclosure provides a method for reducing wear in a compression-ignited engine, the method comprising (1) lubricating the engine with a crankcase lubricant comprising: (a) a base oil; (b) from about 0.04 to about 0.2 wt.% oleamide based on a total weight of the lubricant; (c) zinc dihydrocarbyl dithiophosphate in an amount sufficient to provide from about 200 to about 1100 ppm by weight of phosphorus based on the total weight of the lubricant; and (d) from about 2 to about 7 wt% of a hydrocarbyl soluble dispersant based on the total weight of the lubricant, wherein the hydrocarbyl dispersant comprises (1) a functionalized dispersant comprising a reaction product of (i) a hydrocarbyl-dicarboxylic acid or anhydride, (ii) a polyamine, (iii) a dicarboxyl-containing fused aromatic compound or anhydride thereof, and optionally, (iv) a non-aromatic dicarboxylic acid or anhydride, wherein the hydrocarbyl group of the hydrocarbyl-dicarboxylic acid or anhydride has a number average

molecular weight of greater than 1800 Daltons as determined by gel permeation chromatography; and (2) one or more hydrocarbyl substituted succinimide dispersants other than component (1), wherein the hydrocarbyl substituent of component (2) is derived from a polyolefin having a number average molecular weight ranging from about 950 to about 3000 Daltons as determined by gel permeation chromatography and wherein a weight ratio of (1) to (2) in the lubricant ranges from about 1:1 to about 1:10.

[00023] In another embodiment of the disclosure, the zinc dihydrocarbyl dithiophosphate is derived from all primary alcohols or a mixture of primary and secondary alcohols.

[00024] In another embodiment, at least 60 mole % of hydrocarbyl groups in the zinc dihydrocarbyl dithiophosphate are derived from primary alcohols

[00025] In another embodiment, the lubricant comprises from about 0.04 to about 0.2 wt.% of oleamide based on a total weight of the lubricant composition.

[00026] In one embodiment of the disclosure the lubricant comprises from about 1 to about 10 percent by weight of the dispersant based on a total weight of the lubricant composition.

[00027] In one embodiment of the disclosure the lubricant comprises from about 2 to about 7 percent by weight of the dispersant based on a total weight of the lubricant composition.

[00028] In another embodiment, a method of reducing wear in a compression-ignition engine comprises lubricating the engine with a lubricant comprising: (a) a base oil; (b) from about 0.04 to about 0.2 wt.% oleamide based on a total weight of the lubricant; (c) zinc dihydrocarbyl dithiophosphate in an amount sufficient to provide from about 200 to about 1100 ppm by weight of phosphorus based on a total weight of the lubricant; and (d) from about 2 to about 7 wt% of a hydrocarbyl soluble dispersant based on a total weight of the lubricant.

[00029] The following definitions of terms are provided in order to clarify the meanings of certain terms as used herein.

[00030] As used herein, the terms "oil composition," "lubrication composition," "lubricating oil composition," "lubricating oil," "lubricant composition," "lubricating composition," "fully formulated lubricant composition," "lubricant," "crankcase oil," "crankcase

What is claimed is:

1. A crankcase lubricant for a compression-ignited engine, the lubricant comprising:

(a) a base oil;

(b) oleamide;

(c) zinc dihydrocarbyl dithiophosphate; ~~and~~

(d) a functionalized dispersant comprising a reaction product of (i) a hydrocarbyl-dicarboxylic acid or anhydride, (ii) a polyamine, (iii) a dicarboxyl-containing fused aromatic compound or anhydride thereof, and optionally, (iv) a non-aromatic dicarboxylic acid or anhydride, wherein the hydrocarbyl group of the hydrocarbyl-dicarboxylic acid or anhydride has a number average molecular weight of greater than 1800 Daltons as determined by gel permeation chromatography; and

(e) one or more hydrocarbyl substituted succinimide dispersants other than component (d), wherein the hydrocarbyl substituent of component (e) is derived from a polyolefin having a number average molecular weight ranging from about 950 to about 3000 Daltons as determined by gel permeation chromatography and wherein a weight ratio of (e) to (d) in the lubricant ranges from about 1:1 to about 1:10.

2. The crankcase lubricant of claim 1, wherein component (iii) comprises 1,8-naphthalic anhydride.

3. The crankcase lubricant of claim 1, wherein component (i) comprises a polyisobutenyl succinic acid or anhydride, component (iii) comprises 1,8-naphthalic anhydride, and component (iv) comprises maleic anhydride.

4. The crankcase lubricant of claim 3, wherein the polyisobutenyl group of component (d) is derived from polyisobutylene having greater than 50 mole percent terminal vinylidene content.

5. The crankcase lubricant of claim 1, wherein from about 0.25 to about 1.5 moles of component (iv) are reacted per mole of component (ii).

~~6. The lubricant of claim 1, wherein the lubricant composition further comprises (e) one or more hydrocarbyl substituted succinimide dispersants other than component (d), wherein the hydrocarbyl substituent of component (e) is derived from a polyolefin having a number average molecular weight ranging from about 950 to about 3000 Daltons as determined by gel permeation chromatography and wherein a weight ratio of (e) to (d) in the lubricant ranges from about 1:1 to about 1:10.~~

~~7~~6. The crankcase lubricant of claim 1, wherein the zinc dihydrocarbyl dithiophosphate of component (c) is derived from the group consisting of all primary alcohols; all secondary alcohols; and a mixture of primary and secondary alcohols.

~~8~~7. The crankcase lubricant of claim ~~7~~6, wherein the zinc dihydrocarbyl dithiophosphate of component (c) comprises a mixture of zinc dihydrocarbyl dithiophosphates wherein at least 30 mole % of hydrocarbyl groups in the mixture of zinc dihydrocarbyl dithiophosphates are derived from primary alcohols.

~~9~~8. The crankcase lubricant of claim ~~7~~6, wherein the zinc dihydrocarbyl dithiophosphate of component (c) is derived from the mixture of primary and secondary alcohols and wherein at least 60 mole % of hydrocarbyl groups in the zinc dihydrocarbyl dithiophosphate are derived from primary alcohols.

~~10~~9. The crankcase lubricant of claim ~~9~~8, wherein the lubricant contains from about 200 to about 1100 ppm by weight of phosphorus based on a total weight of the lubricant.

~~11~~10. The crankcase lubricant of claim 1 wherein the lubricant comprises from about 0.04 wt% to about 0.2 wt% of oleamide based on a total weight of the lubricant.

~~12~~11. The crankcase lubricant of claim 1 wherein the lubricant comprises from about 2 wt% to about 7 wt% of the functionalized dispersant (d) based on a total weight of the lubricant.

~~13~~12. The crankcase lubricant of claim 1, wherein from about 0.04 wt% to about 0.2 wt% of oleamide is present in the lubricant and from about 2 wt% to about 7 wt% of the functionalized dispersant (d) is present in the lubricant based on a total weight of the lubricant.

~~14~~13. The crankcase lubricant of claim ~~13~~12, wherein the zinc dithiophosphate of component (c) delivers approximately 1100 ppm of phosphorus to the lubricant based on a total weight of the lubricant.

~~15~~14. The crankcase lubricant of claim ~~14~~13, wherein at least 60 mole % of hydrocarbyl groups in the zinc dihydrocarbyl dithiophosphate of component (c) are derived from primary alcohols.

~~16~~15. A crankcase lubricant for a compression-ignited engine, the lubricant comprising:

(a) a base oil;

(b) from about 0.04 to about 0.2 wt.% oleamide based on a total weight of the lubricant;

(c) zinc dihydrocarbyl dithiophosphate; and

(d) a hydrocarbyl dispersant, wherein the hydrocarbyl dispersant comprises (1) a functionalized dispersant comprising a reaction product of (i) a hydrocarbyl-dicarboxylic acid or anhydride, (ii) a polyamine, (iii) a dicarboxyl-containing fused aromatic compound or anhydride thereof, and optionally, (iv) a non-aromatic dicarboxylic acid or anhydride, wherein the hydrocarbyl group of the hydrocarbyl-dicarboxylic acid or anhydride has a number average molecular weight of greater than 1800 Daltons as determined by gel permeation chromatography; and (2) one or more hydrocarbyl substituted succinimide dispersants other than component (1), wherein the hydrocarbyl substituent of component (2) is derived from a polyolefin having a number average molecular weight ranging from about 950 to about 3000 Daltons as determined by gel permeation chromatography and wherein a weight ratio of (1) to (2) in the lubricant ranges from about 1:1 to about 1:10.

~~17~~16. The crankcase lubricant of claim ~~16~~15, wherein the lubricant comprises from about 2 to about 7 wt% of the ~~hydrocarbyl soluble~~functionalized dispersant (1) based on the total weight of the lubricant; and wherein the zinc dihydrocarbyl dithiophosphate is present in an amount sufficient to provide from about 200 to about 1100 ppm by weight of phosphorus based on the total weight of the lubricant.

~~18~~17. A method for reducing wear in a compression-ignited engine, the method comprising:

(1) lubricating the engine with a crankcase lubricant comprising:

(a) a base oil;

(b) oleamide;

(c) zinc dihydrocarbyl dithiophosphate; and

(d) a functionalized dispersant comprising a reaction product of (i) a hydrocarbyl-dicarboxylic acid or anhydride, (ii) a polyamine, (iii) a dicarboxyl-containing fused aromatic compound or anhydride thereof, and optionally, (iv) a non-aromatic dicarboxylic acid or anhydride, wherein the hydrocarbyl group of the hydrocarbyl-dicarboxylic acid or anhydride has a number average molecular weight of greater than 1800 Daltons as determined by gel permeation chromatography; and

(e) one or more hydrocarbyl substituted succinimide dispersants other than component (d), wherein the hydrocarbyl substituent of component (e) is derived from a polyolefin having a number average molecular weight ranging from about 950 to about 3000 Daltons as determined by gel permeation chromatography and wherein a weight ratio of (e) to (d) in the lubricant ranges from about 1:1 to about 1:10.

~~19~~18. The method of any of claims ~~18~~17, wherein component (i) comprises a polyisobutenyl succinic acid or anhydride, component (iii) comprises 1,8-naphthalic anhydride, and component (iv) comprises maleic anhydride.

~~20~~19. The method of claim ~~18~~17, wherein the polyisobutenyl group of component (d) is derived from polyisobutylene having greater than 50 mole percent terminal vinylidene content.

~~21~~20. The method of claim ~~18~~17, wherein the lubricant comprises from about 0.04 wt% to about 0.2 wt% of oleamide based on a total weight of the lubricant.

~~22~~21. The method of claim ~~18~~17, wherein the lubricant comprises from about 2 wt% to about 7 wt% of the functionalized dispersant (d) based on a total weight of the lubricant.

~~23~~22. The method of claim ~~18~~17, wherein from about 0.04 wt% to about 0.2 wt% of oleamide is present in the lubricant and from about 2 wt% to about 7 wt% of the functionalized dispersant (d) is present in the lubricant based on a total weight of the lubricant.

~~24~~23. The method of claim ~~18~~17, wherein the zinc dihydrocarbyl dithiophosphate of component (c) is derived from the group consisting of: all primary alcohols, all secondary alcohols, or a mixture of primary and secondary alcohols.

~~25~~24. The method of claim ~~24~~23, wherein the zinc dihydrocarbyl dithiophosphate of component (c) comprises a mixture of zinc dihydrocarbyl dithiophosphates and wherein at least 30 mole % of hydrocarbyl groups in the mixture of zinc dihydrocarbyl dithiophosphates are derived from primary alcohols.

~~26~~25. The method of claim ~~24~~23, wherein the zinc dihydrocarbyl dithiophosphate of component (c) is derived from the mixture of primary and secondary alcohols and wherein at least 60 mole % of hydrocarbyl groups in the zinc dihydrocarbyl dithiophosphate are derived from primary alcohols.

~~27~~26. The method of claim ~~26~~25, wherein the lubricant contains from about 200 to about 1100 ppm by weight of phosphorus based on a total weight of the lubricant.

~~28~~27. The method of claim ~~18~~17, wherein the zinc dithiophosphate of component (c) delivers approximately 1100 ppm of phosphorus to the lubricant based on a total weight of the lubricant.

~~29~~28. A method for reducing wear in a compression-ignited engine, the method comprising:

(1) lubricating the engine with a crankcase lubricant comprising:

(a) a base oil;

(b) from about 0.04 to about 0.2 wt.% oleamide based on a total weight of the lubricant;

(c) zinc dihydrocarbyl dithiophosphate in an amount sufficient to provide from about 200 to about 1100 ppm by weight of phosphorus based on the total weight of the lubricant; and

(d) from about 2 to about 7 wt% of a hydrocarbyl soluble dispersant based on the total weight of the lubricant, wherein the hydrocarbyl dispersant comprises (1) a functionalized dispersant comprising a reaction product of (i) a hydrocarbyl-dicarboxylic acid or anhydride, (ii) a polyamine, (iii) a dicarboxyl-containing fused aromatic compound or anhydride thereof, and optionally, (iv) a non-aromatic dicarboxylic acid or anhydride, wherein the hydrocarbyl group of the hydrocarbyl-dicarboxylic acid or anhydride has a number average molecular weight of greater than 1800 Daltons as determined by gel permeation chromatography; and (2) one or more hydrocarbyl substituted succinimide dispersants other than component (1), wherein the hydrocarbyl substituent of component (2) is derived from a polyolefin having a number average molecular weight ranging from about 950 to about 3000 Daltons as determined by gel permeation chromatography and wherein a weight ratio of (1) to (2) in the lubricant ranges from about 1:1 to about 1:10.

~~30~~29. The lubricant of claim ~~29~~28, wherein at least 60 mole % of hydrocarbyl groups in the zinc dihydrocarbyl dithiophosphate of component (c) are derived from primary alcohols.