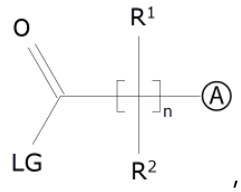
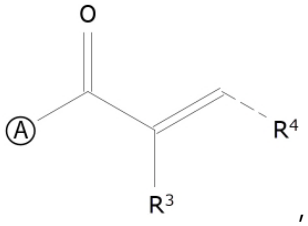
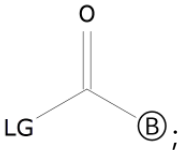
WHAT IS CLAIMED IS:

1. An oil soluble or dispersible dispersant composition comprising the reaction product of:

(i) a polyalkenyl succinimide post-treated with a post-treating agent selected from the group consisting of an organic carbonate, an epoxide, a lactone, a hydroxyaliphatic carboxylic acid, and combinations thereof; and

(ii) an acylating agent selected from one of the following structures (a) through (c):

(a)  , (b)  , or (c)  ;

wherein:

LG is a leaving group capable of being displaced in an acylation reaction;

each of R^1, R^2, R^3, and R^4 is independently selected from hydrogen, alkyl, and aryl;

n is from 1 to 28;

Ⓐ is an amine moiety; and

Ⓑ is an aromatic, heteroaromatic, alkaryl, or alkheteroaryl moiety having from 4 to 20 carbon atoms.

2. The dispersant composition according to claim 1, wherein the polyalkenyl substituent of the polyalkenyl succinimide has a number average molecular weight of from 500 to 3000.

3. The dispersant composition according to claim 1, wherein the polyalkenyl succinimide is a polyisobutenyl succinimide.

4. The dispersant composition according to claim 1, wherein the organic carbonate comprises one or more of ethylene carbonate, propylene carbonate, butylene carbonate, and glycerine carbonate.

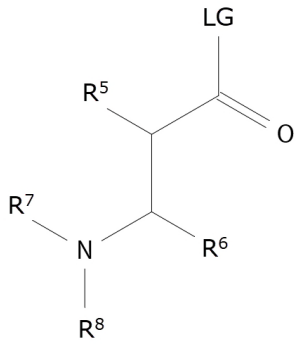
5. The dispersant composition according to claim 1, wherein the epoxide comprises one or more of ethylene oxide, propylene oxide, butylene oxide, styrene oxide, and glycidol.

6. The dispersant composition according to claim 1, wherein the lactone comprises one or more of β-propiolactone, γ-butyrolactone, δ-valerolactone, γ-valerolactone, ε-caprolactone, and δ-caprolactone.

7. The dispersant composition according to claim 1, wherein the hydroxyaliphatic carboxylic acid comprises one or more of glycolic acid, lactic acid, 3-hydroxypropionic acid, and 2,2-bis(hydroxymethyl)propionic acid.

8. The dispersant composition according to claim 1, wherein the acylating agent has the following structure (f):

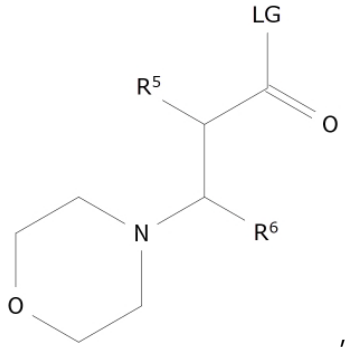
(f)



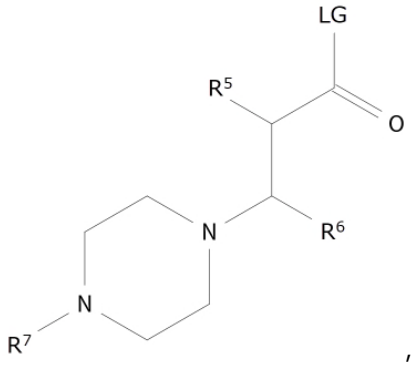
wherein each of R^5 and R^6 is independently selected from H, C_1-C_{30}-alkyl, C_3-C_8 cycloalkyl, or aryl; and each of R^7 and R^8 is independently selected from H, C_1-C_{30} alkyl, C_3-C_8 cycloalkyl, aryl, 3-propionyl acid, or 3-propionyl acid ester or when taken

together to the nitrogen atom to which they are attached form a nitrogen containing heterocycle.

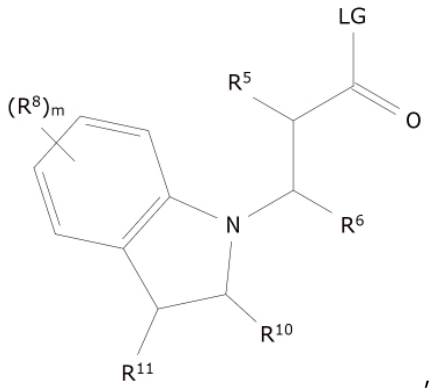
9. The dispersant composition according to claim 8, wherein the acylating agent is selected from the following structures (g) through (q):

(g) 

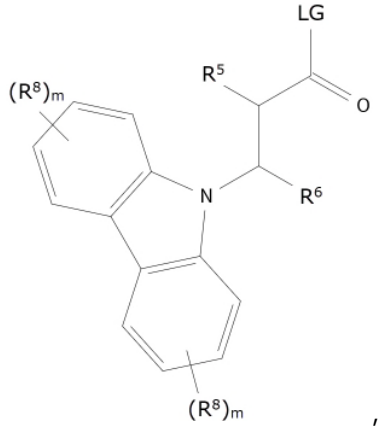
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(h) 

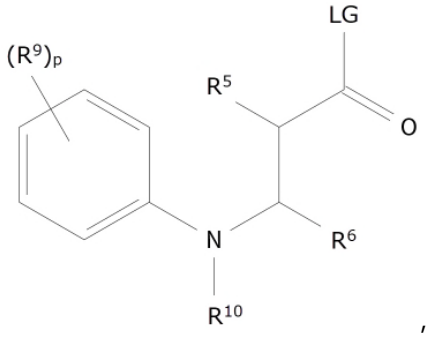
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(i) 

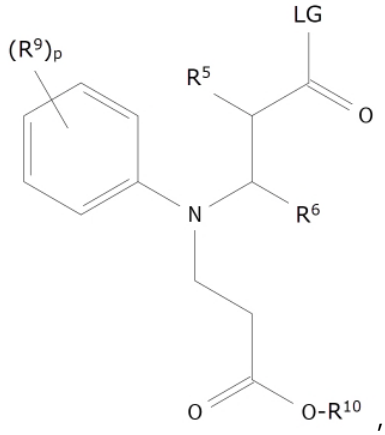
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(j) 

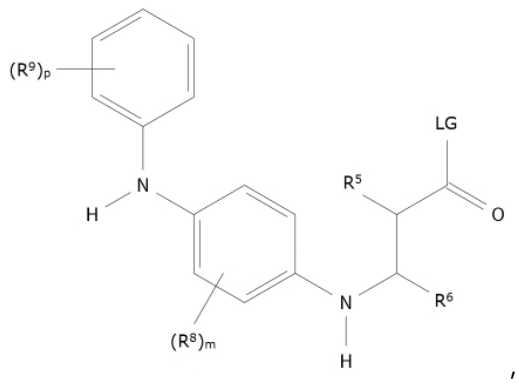
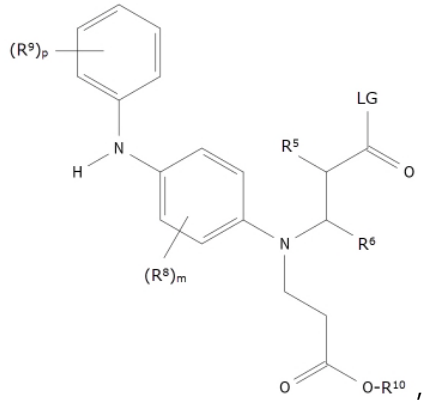
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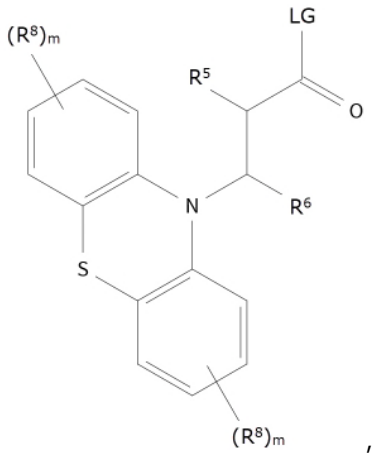
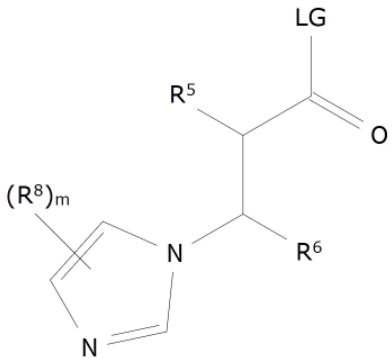
(k) 

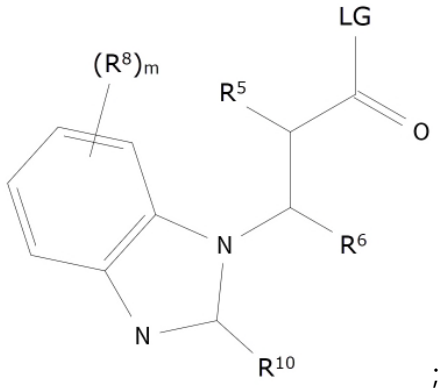
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(l) 

,

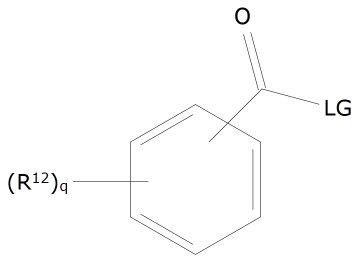
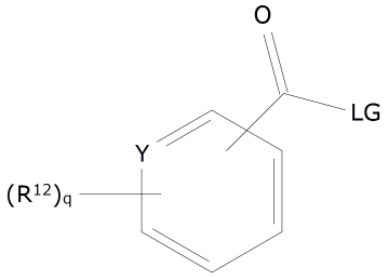
(m)  , (n)  ,

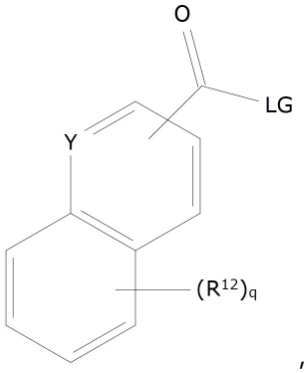
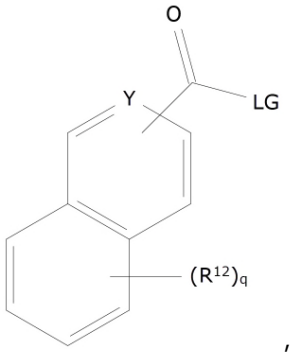
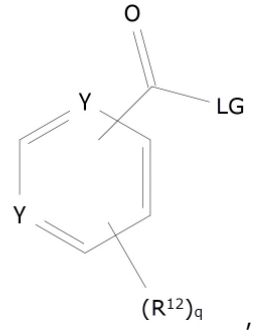
(o)  , (p)  , or

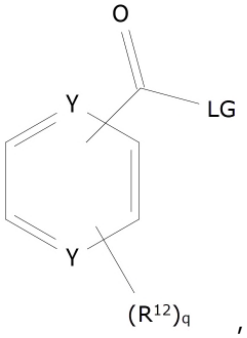
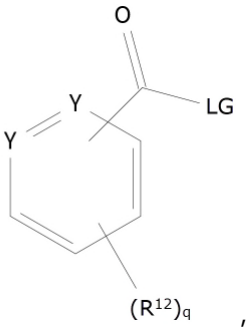
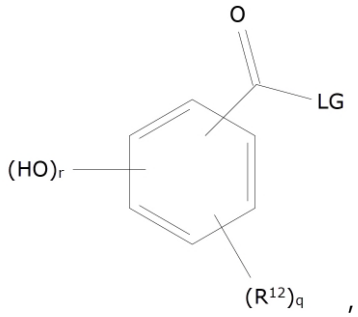
(q)  ;

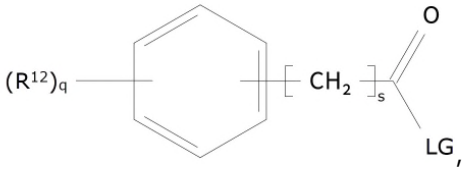
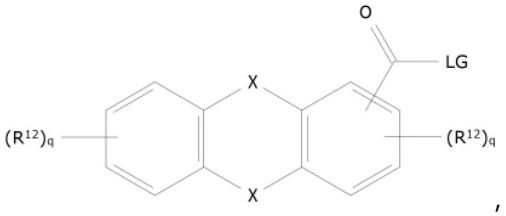
wherein each of R^5 and R^6 is independently selected from H, C_1-C_{30} alkyl, C_3-C_8 cycloalkyl, and aryl; and each of R^7, R^8, R^9, R^{10} and R^{11} is independently selected from hydrogen, alkyl, or aryl; m is an integer from 1 to 4; and p is an integer from 1 to 5.

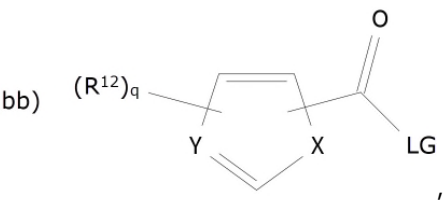
10. The dispersant composition according to claim 8, wherein the acylating agent is selected from one of the following structures (r) through (dd):

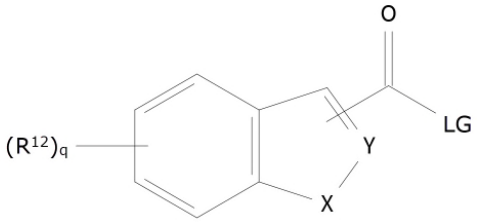
(r) , (s) ,

(t) , (u) , (v) ,

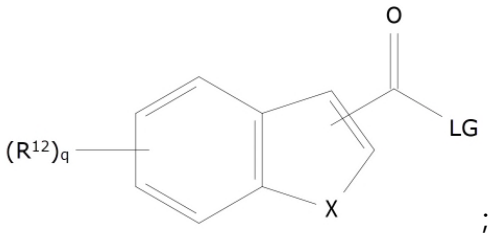
(w) , (x) , (y) ,

(z) , (aa) ,

(bb) 

, (cc) 

, or

(dd) 

;

wherein each X is independently selected from CH_2, O, S, and NR, where R is H or aryl, heteroaryl, alkyl, alkaryl, or alkheteroaryl; each Y is independently selected from CH and N; each R^{12} is independently selected from H, alkyl and aryl; q is an integer from 0 to 5; r is an integer from 0 to 5; and s is an integer from 1 to 10.

11. The dispersant composition of claim 1, wherein a charge mole ratio of the acylating agent (ii) to the polylalkenyl succinimide (i) is in a range of 0.3:1 to 3:1.

12. A lubricating oil composition comprising (a) at least 50% by weight based on the total weight of the lubricating oil composition of an oil of lubricating viscosity and (b) from 0.05 to 15 wt. %, based on the total weight of the lubricating oil composition, of the dispersant composition of claim 1.

13. The lubricating oil composition of claim 12, further comprising at least one additive selected from the group consisting of demulsifiers, detergents, dispersants, extreme pressure agents, foam inhibitors, friction modifiers, multifunctional additives, oxidation inhibitors, pour point depressants, rust inhibitors, wear inhibitors, and combinations thereof.

14. A lubricating oil additive concentrate comprising from 80 to 20 wt. % of an organic liquid diluent and from 20 to 80 wt. % of the dispersant composition of Claim 1.

15. A method for controlling soot-induced viscosity increase in a compression ignition engine lubricated with a lubricating oil by using as the lubricating oil the lubricating oil composition of claim 12.

16. A method for improving lead corrosion performance in a compression ignition engine lubricated with a lubricating oil by using as the lubricating oil the lubricating oil composition of claim 12, wherein the lubricating oil is one that is determined to be corrosive to lead according to the High Temperature Corrosion Bench Test ASTM D6594 when the dispersant composition is not present.