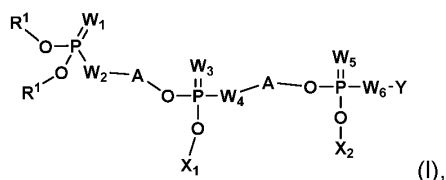
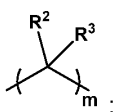


CLAIMS

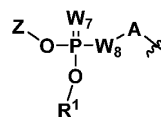
1. A compound of formula (I)



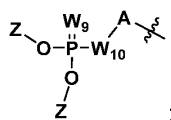
or a tribologically acceptable salt thereof,



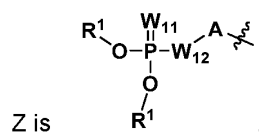
- 5 wherein A is:  ;
- each R¹ is the same or different and is independently selected from alkyl, alkenyl, cycloalkyl, cycloalkylalkyl, aryl, and aralkyl, wherein said aryl and aralkyl are optionally substituted with one to three substituents each independently selected from alkyl and alkenyl ;
- 10 each R² and R³ are independently selected from H, alkyl, alkenyl, cycloalkyl and cycloalkylalkyl;
- Y is selected from the group consisting of alkyl, alkoxyalkyl, benzyl, and -R⁴-R⁵-R⁶;
- R⁴ is alkylene;
- 15 R⁵ is selected from the group consisting of a bond, alkylene; -C(O)- and -C(R⁷)-;
- R⁶ is selected from the group consisting of alkyl, hydroxyalkyl, hydroxyalkyleneoxy, hydroxy and alkoxy;
- R⁷ is hydroxy;
- 20 m is an integer from 2 to 8;
- X₁ is R⁸ or Z;



X_2 is selected from the group consisting of R^8 , R^1 , and



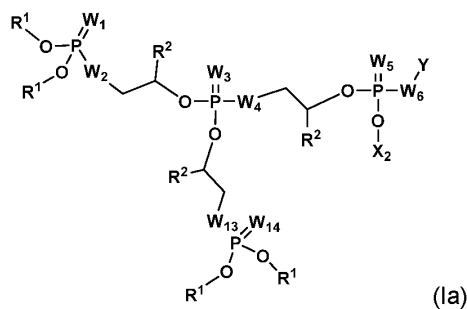
R^8 is alkyl, alkenyl, cycloalkyl, cycloalkylalkyl, aryl, and aralkyl, wherein said aryl and aralkyl are optionally substituted with one to three substituents each independently selected from alkyl and alkenyl; and



5 wherein when X_2 is R^8 , X_1 is Z; and

wherein W_1 - W_{12} are each independently O or S, and at least one of W_1 - W_{12} is O.

2. The compound of claim 1, wherein the compound is a compound of formula (Ia)



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or a tribologically acceptable salt thereof,

each R^1 is the same or different and is independently selected from alkyl, alkenyl, cycloalkyl, cycloalkylalkyl, aryl, and aralkyl, wherein said aryl and aralkyl are optionally substituted with one to three substituents each independently selected from alkyl and alkenyl;

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each R^2 is independently selected from alkyl, alkenyl, cycloalkyl and cycloalkylalkyl;

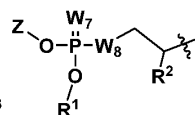
Y is selected from the group consisting of alkyl, alkoxyalkyl, benzyl, and $-R^4$ - R^5 - R^6 ;

20 R^4 is alkylene;

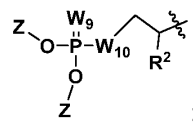
R^5 is selected from the group consisting of a bond, alkylene; $-C(O)-$ and $-C(R^7)-$;

R^6 is selected from the group consisting of alkyl, hydroxyalkyl, hydroxyalkyleneoxy, hydroxy and alkoxy;

R^7 is hydroxy;

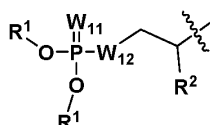


X_2 is selected from the group consisting of R^8 , , and



5

R^8 is alkyl, alkenyl, cycloalkyl, cycloalkylalkyl, aryl, and aralkyl, wherein said aryl and aralkyl are optionally substituted with one to three substituents each independently selected from alkyl and alkenyl;



Z is ; and

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W_1 - W_{14} are each independently O or S, and at least one of W_1 - W_{14} is O.

3. The compound of claim 1 or 2, wherein each R^1 is the same or different and is independently selected from C_1 - C_{30} alkyl, C_2 - C_{30} alkenyl, cycloalkyl, cycloalkylalkyl, aryl and aralkyl, wherein said aryl and aralkyl are optionally substituted with one to three substituents each independently selected from C_1 - C_{10} alkyl and C_2 - C_{10} alkenyl.

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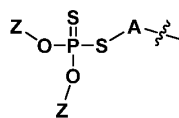
4. The compound of claim 3, wherein each R^1 is the same or different and is independently C_3 - C_{10} alkyl.

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5. The compound of claim 1, wherein m is 2.

6. The compound of claim 1, wherein for each A, one R^2 is alkyl and the remaining instances of R^2 and R^3 are H.

7. The compound of any one of claims 1 to 4, wherein R^2 is C_1 - C_{10} alkyl.

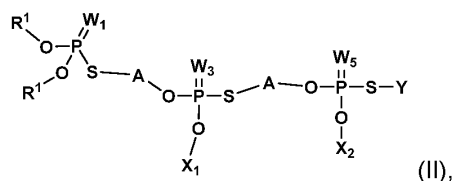


8. The compound of claim 1, wherein X_2 is

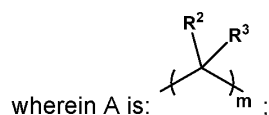
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9. The compound of any one of claims 1 to 7, wherein X_2 is R^8 .

10. The compound of any one of claims 1 to 9, wherein Y is $-R^4-R^5-R^6$ and R^4 is alkylene, R^5 is $-C(O)-$, and R^6 is hydroxy or alkoxy.
11. The compound of claim 9, wherein R^8 is C_1-C_{10} alkyl.
12. The compound of claim 1, wherein the compound is a compound of formula
- 5 (II)

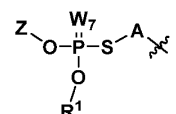


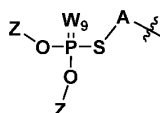
or a tribologically acceptable salt thereof,



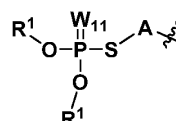
wherein A is:

- each R^1 is the same or different and is independently selected from alkyl, alkenyl, cycloalkyl, cycloalkylalkyl, aryl, and aralkyl, wherein said aryl and aralkyl are optionally substituted with one to three substituents each independently selected from alkyl and alkenyl ;
- each R^2 and R^3 are independently selected from H, alkyl, alkenyl, cycloalkyl and cycloalkylalkyl;
- 15 Y is selected from the group consisting of alkyl, alkoxyalkyl, benzyl, and $-R^4-R^5-R^6$;
- R^4 is alkylene;
- R^5 is selected from the group consisting of a bond, alkylene; $-C(O)-$ and $-C(R^7)-$;
- 20 R^6 is selected from the group consisting of alkyl, hydroxyalkyl, hydroxyalkyleneoxy, hydroxy and alkoxy;
- R^7 is hydroxy;
- m is an integer from 2 to 8;
- X_1 is R^8 or Z;

X_2 is selected from the group consisting of R^8 , , and

; R^8 is alkyl, alkenyl, cycloalkyl, cycloalkylalkyl, aryl, and aralkyl, wherein said aryl and aralkyl are optionally substituted with one to three substituents each independently selected from alkyl and alkenyl; and

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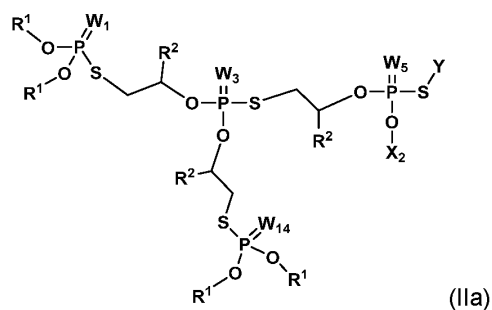
Z is ,

wherein when X_2 is R^8 , X_1 is Z ; and

wherein W_1 , W_3 , W_5 , W_7 , W_9 , and W_{11} are each independently O or S, and at least one of W_1 , W_3 , W_5 , W_7 , W_9 , and W_{11} is O.

13. The compound of claim 12, wherein the compound of formula (II) is a compound of formula (IIa):

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or a tribologically acceptable salt thereof,

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each R^1 is the same or different and is independently selected from alkyl, alkenyl, cycloalkyl, cycloalkylalkyl, aryl, and aralkyl, wherein said aryl and aralkyl are optionally substituted with one to three substituents each independently selected from alkyl and alkenyl;

each R^2 is independently selected from alkyl, alkenyl, cycloalkyl and cycloalkylalkyl;

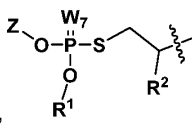
Y is selected from the group consisting of alkyl, alkoxyalkyl, benzyl, and $-R^4-R^5-R^6$;

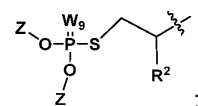
R^4 is alkylene;

R^5 is selected from the group consisting of a bond, alkylene, $-C(O)-$ and $-C(R^7)-$;

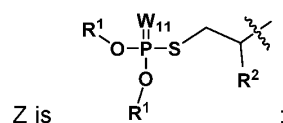
R^6 is selected from the group consisting of alkyl, hydroxyalkyl, hydroxyalkyleneoxy, hydroxy and alkoxy;

R^7 is hydroxy;

X_2 is selected from the group consisting of R^8 , , and



R^8 is alkyl, alkenyl, cycloalkyl, cycloalkylalkyl, aryl, and aralkyl, wherein said aryl and aralkyl are optionally substituted with one to three substituents each independently selected from alkyl and alkenyl; and



$W_1, W_3, W_5, W_7, W_9, W_{11}$ and W_{14} are each independently O or S, and at least one of $W_1, W_3, W_5, W_7, W_9, W_{11}$ and W_{14} is O.

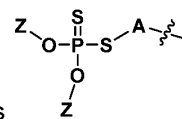
14. The compound of claim 12 or 13, wherein each R^1 is the same or different and is independently selected from C_1 - C_{30} alkyl, C_2 - C_{30} alkenyl, cycloalkyl, cycloalkylalkyl, aryl and aralkyl, wherein said aryl and aralkyl are optionally substituted with one to three substituents each independently selected from C_1 - C_{10} alkyl and C_2 - C_{10} alkenyl.

15. The compound of claim 14, wherein each R^1 is the same or different and is independently C_3 - C_{10} alkyl.

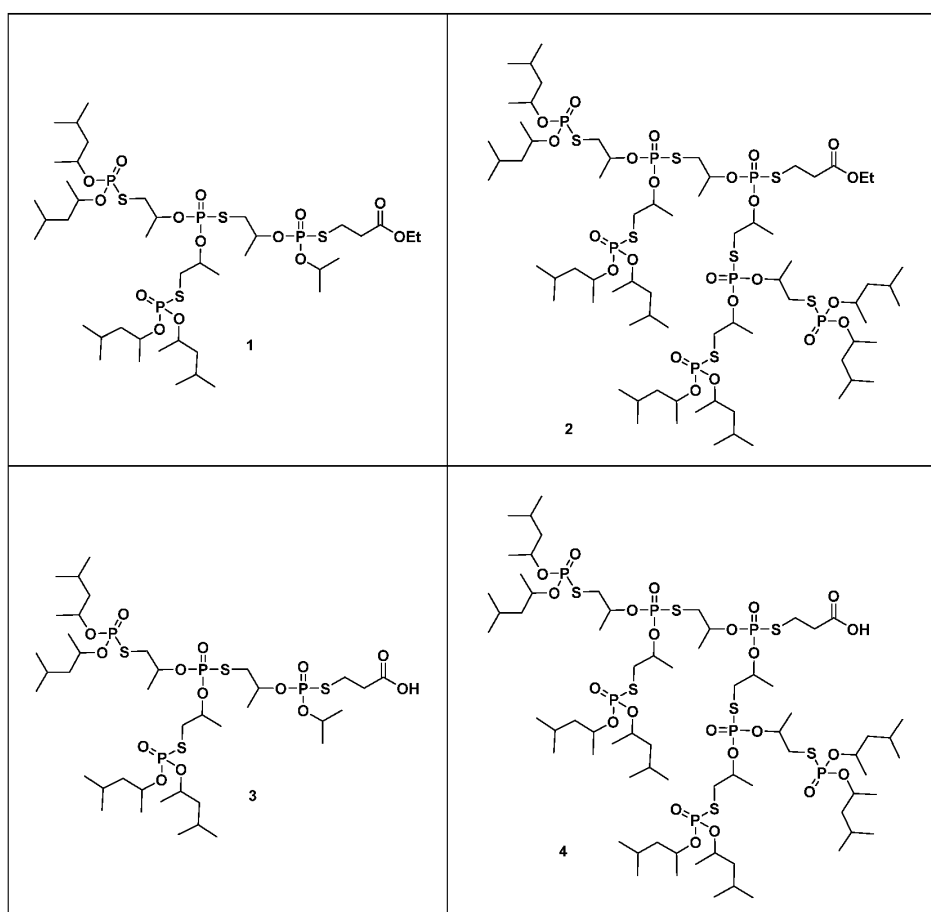
16. The compound of claim 12, wherein m is 2.

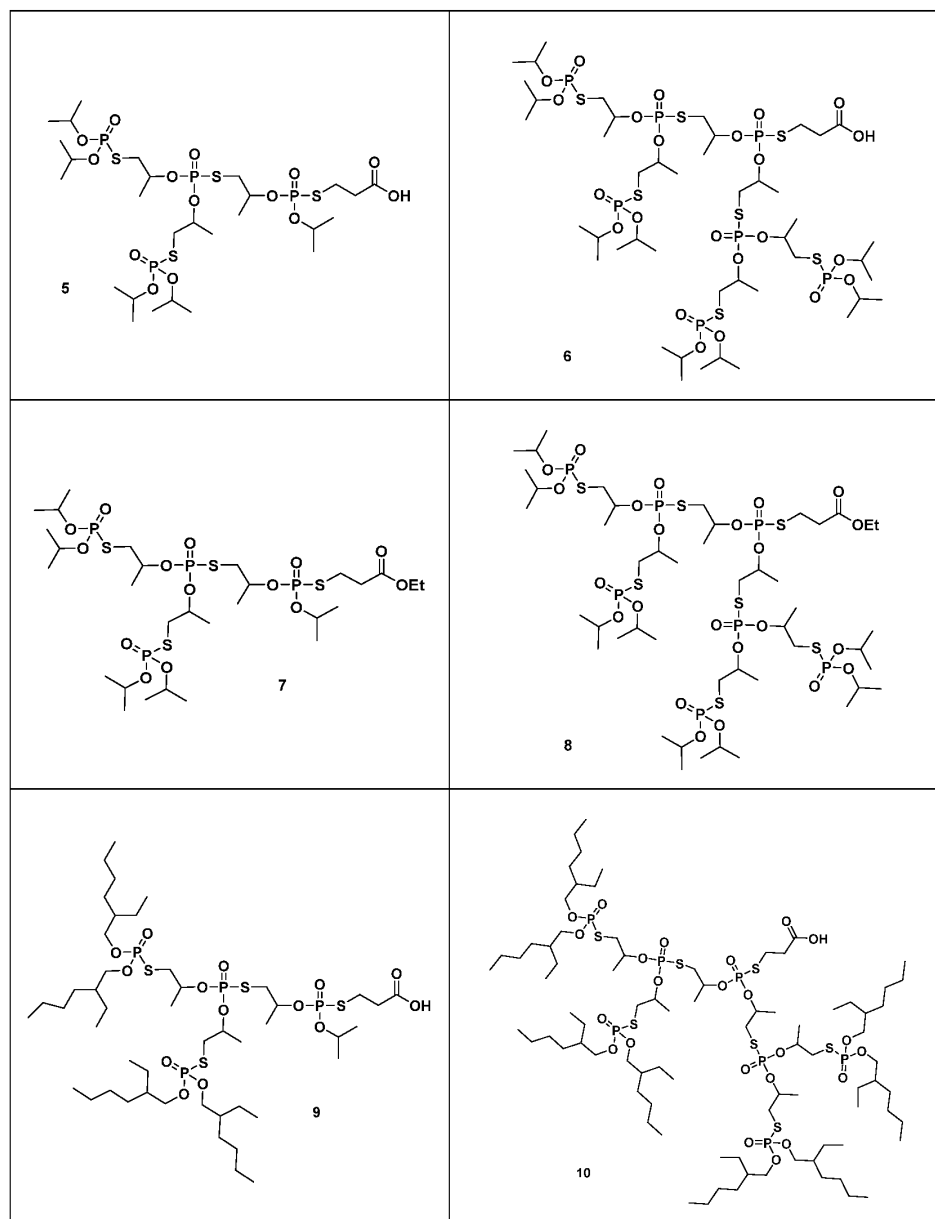
17. The compound of claim 12, wherein for each A, one R^2 is alkyl and the remaining instances of R^2 and R^3 are H.

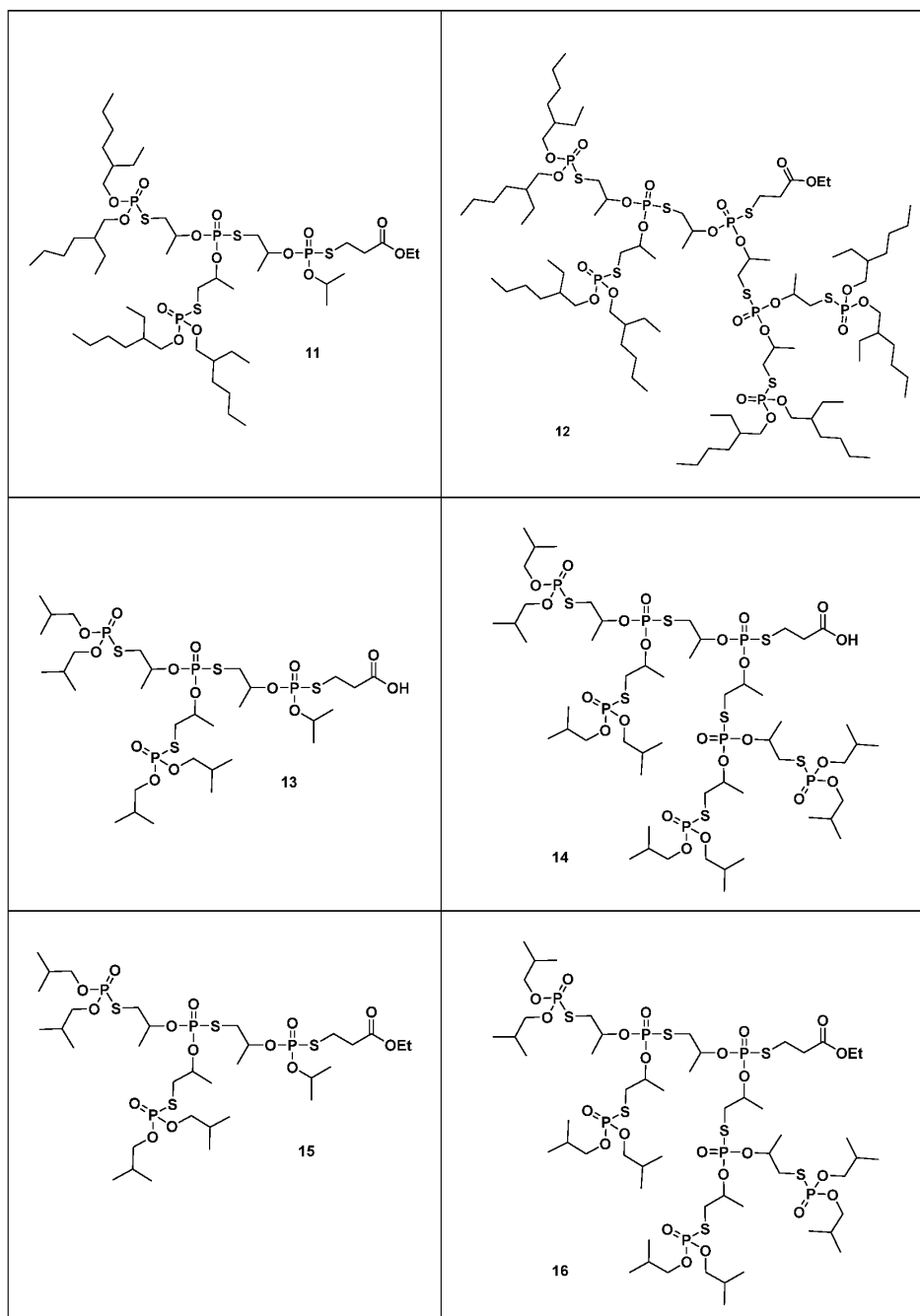
18. The compound of any one of claims 12 to 17, wherein R^2 is C_1 - C_{10} alkyl.

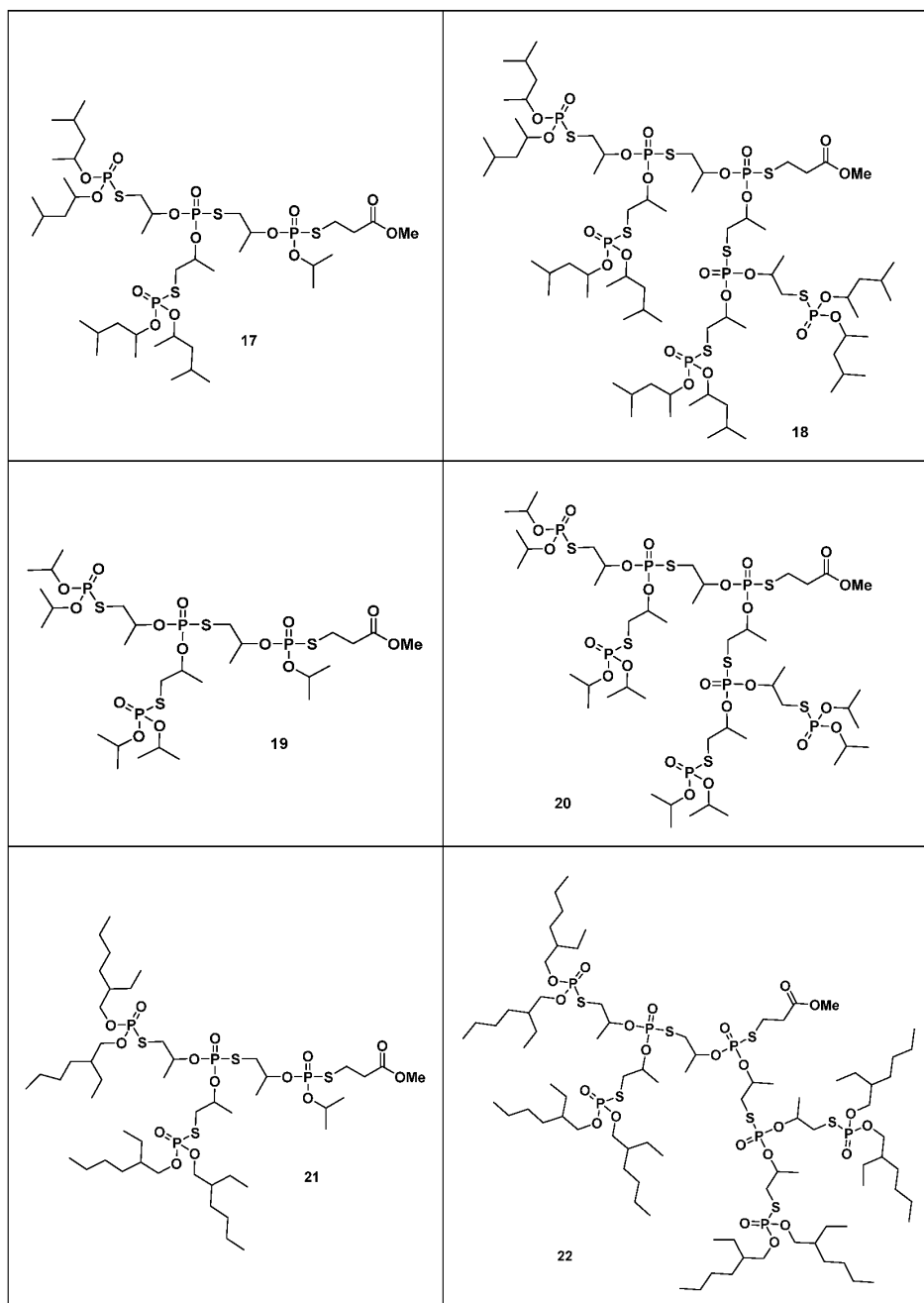


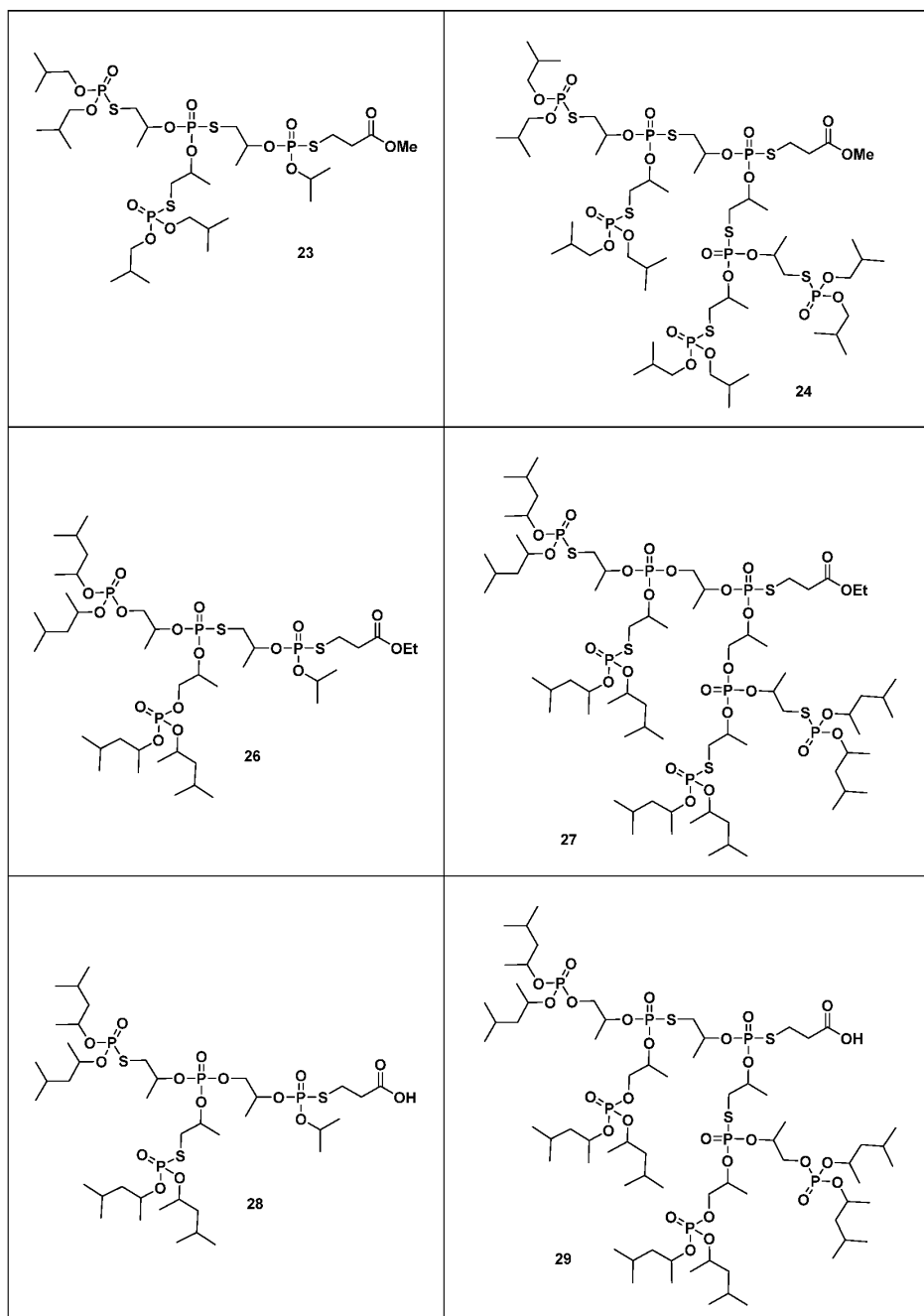
19. The compound of claim 12, wherein X_2 is
20. The compound of any one of claims 12 to 18, wherein X_2 is R^8 .
21. The compound of any one of claims 12 to 20, wherein Y is $-R^4-R^5-R^6$ and R^4 is alkylene, R^5 is $-C(O)-$, and R^6 is hydroxy or alkoxy.
- 5 22. The compound of claim 20, wherein R^8 is C_1 - C_{10} alkyl.
23. The compound of claim 1, selected from











24. A lubricant additive composition comprising a compound of any one of claims 1 to 23.

25. The lubricant additive composition of claim 24, wherein the lubricant additive composition further comprises one or more additive components selected from the group consisting of an antioxidant, antiwear agents, corrosion inhibitor, detergent, extreme pressure agent, dispersant, viscosity index improvers, and friction modifiers.
26. A lubricant composition comprising:
- a) a base oil; and
 - b) a compound as claimed in any one of claims 1 to 23, and wherein the base oil is a major amount of the composition.
27. The lubricant composition of claim 26, wherein the lubricant composition further comprises one or more additive components selected from the group consisting of an antioxidant, antiwear agents, corrosion inhibitor, detergent, extreme pressure agent, dispersant, viscosity index improvers, and friction modifiers.
28. The lubricant composition of claim 26 or 27, wherein the compound is present in an amount from about 0.010 wt% to about 5 wt% based on the total weight of the lubricant composition.
29. A method of lubricating moving metal surfaces comprising lubricating the metal surfaces with a lubricant composition of any one of claims 26 to 28.
30. The method of claim 29 wherein the moving metal surface is selected from one or more of a gear, an axle, a differential, an engine, a crankshaft, a transmission, a clutch, a hydraulic apparatus, a slideway apparatus, and a turbine.
31. A method of reducing wear between moving metal surfaces of a machine part comprising lubricating the machine part with a lubricant composition comprising:
- a) a major amount of an oil of lubricating viscosity; and
 - b) an effective amount of a compound of any one of claims 1 to 23.