the method provides improved seal compatibility for the static seals containing at least 80% fluoroelastomers as measured by ASTM D1418, relative to a method using a lubricating oil composition absent compounds of the structure.

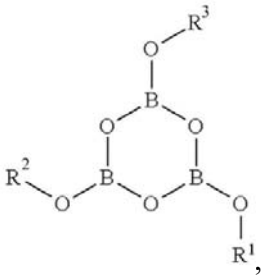
In another aspect, the present disclosure refers to a method comprising:

operating an engine comprising a lubricating oil composition comprising:

a base oil; and

a composition, comprising:

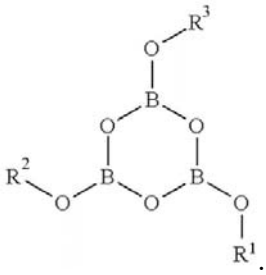
a) one or more compounds having a structure:



wherein each of R^1, R^2, and R^3 is independently an alkyl group, and R^1 is *n*-dodecyl, and the one or more compounds are present in an amount to provide from 300 ppm to 5000 ppm of boron to the lubricating oil composition; and

b) a dispersant.

The present disclosure is generally directed to a composition. In some embodiments, the composition comprises a structure:



Each of R^1, R^2, and R^3 may be independently an alkyl group. In some cases, R^1 comprises at least 8 carbon atoms.

What is claimed is:

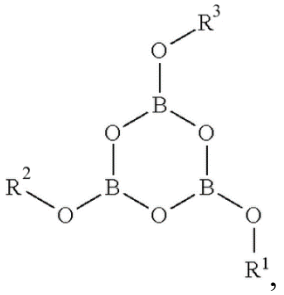
1. A method for improving seal compatibility, comprising:

operating an engine having static seals containing at least 80% fluoroelastomers, said engine comprising a lubricating oil composition comprising:

a base oil; and

a composition, comprising:

a) one or more compounds having a structure:



wherein each of R^1, R^2, and R^3 is independently an alkyl group, and each of R^1, R^2, and R^3 independently comprises at least 8 carbon atoms, and the one or more compounds are present in an amount to provide from 100 ppm to 5000 ppm of boron to the lubricating oil composition; and

b) a dispersant; and

the method provides improved seal compatibility for the static seals containing at least 80% fluoroelastomers as measured by ASTM D1418, relative to a method using a lubricating oil composition absent compounds of the structure.

2. The method of claim 1, wherein each of R^1, R^2, and R^3 independently has 8 to 16 carbon atoms, or from 10 to 16 carbon atoms.

3. The method of claim 1, wherein R^1 has 12 carbon atoms.

4. The method of claim 1, wherein each of R^1, R^2, and R^3 has 12 carbon atoms.

5. The method of claim 1, wherein R^1 is *n*-dodecyl.

6. The method of claim 1, wherein each of R^1, R^2, and R^3 is *n*-dodecyl.

7. The method of claim 1, wherein the composition is free of a sterically hindered amine compound.

8. The method of claim 1, wherein the one or more compounds are present in an amount of from 0.1 wt.% to 10 wt.%, based on a total weight of the lubricating oil composition.

9. The method of claim 1, wherein the one or more compounds are present in an amount to provide from 100 ppm to 3000 ppm of boron, or from 100 ppm to 1500 ppm of boron, or from 100 ppm to 1200 ppm of boron to the lubricating oil composition, based on a total weight of the lubricating oil composition.

10. The method of claim 1, wherein the one or more compounds are present in an amount to provide from 300 ppm to 3000 ppm of boron, or from 500 to 1500 ppm of boron to the lubricating oil composition, based on a total weight of the lubricating oil composition.

11. The method of claim 1, wherein the dispersant is a phosphorylated dispersant.

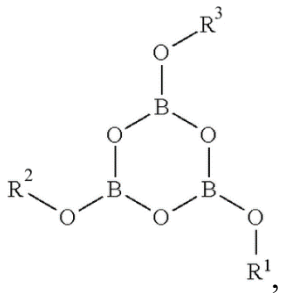
12. A method comprising:

operating an engine comprising a lubricating oil composition comprising:

a base oil; and

a composition, comprising:

a) one or more compounds having a structure:



,

wherein each of R^1, R^2, and R^3 is independently an alkyl group, and R^1 is *n*-dodecyl, and

the one or more compounds are present in an amount to provide from 300 ppm to 5000 ppm of boron to the lubricating oil composition; and

b) a dispersant.