**What is claimed is**:

1. A lubricating oil composition comprising:

greater than 50 wt.% of a base oil of lubricating viscosity, based on a total weight of the lubricating oil composition;

a sufficient amount of one or more overbased calcium-containing detergents having a total base number of greater than 225 mg KOH/g, measured by the method of ASTM D-2896, to provide greater than 1000 ppm calcium to the lubricating oil composition;

one or more overbased magnesium-containing detergents having a total base number of greater than 225 mg KOH/g, measured by the method of ASTM D-2896, wherein the total amount of magnesium provided by the one or more overbased magnesium-containing detergents to the lubricating oil composition 50-1500 ppm; and

one or more molybdenum compounds providing a total amount of molybdenum to the lubricating composition of 50-800 ppm;

wherein a ratio of the wt.% of calcium in the lubricating oil composition from the one or more overbased calcium-containing detergents to the wt.% of magnesium in the lubricating oil composition from the one or more overbased magnesium-containing detergents is less than 11.9;

a ratio of the total ppm of magnesium in the lubricating oil composition to the total TBN of the lubricating oil composition in mg KOH/g of the lubricating oil composition, measured by the method of ASTM D-2896, is greater than 19; and

a ratio of the total ppm of calcium in the lubricating oil composition to the total TBN of the lubricating oil composition in mg KOH/g of the lubricating oil composition, measured by the method of ASTM D-2896, is less than 222.

2. The lubricating oil composition of claim 1, wherein the one or more overbased calcium-containing detergents comprise detergents selected from calcium sulfonate and calcium phenate detergents.

3. The lubricating oil composition of claim 1, wherein the one or more overbased magnesium-containing detergents comprises a magnesium sulfonate detergent.

4. The lubricating oil composition of claim 3, wherein the ratio of the wt.% of calcium in the lubricating oil composition from the one or more overbased calcium-containing detergents to the wt.% of magnesium in the lubricating oil composition from the one or more overbased magnesium-containing detergents is less than 10.

5. The lubricating oil composition of claim 3, wherein the ratio of the wt.% of calcium in the lubricating oil composition from the one or more overbased calcium-containing detergents to the wt.% of magnesium in the lubricating oil composition from the one or more overbased magnesium-containing detergents is from 0.5 to 9.

6. The lubricating oil composition of claim 3, wherein the ratio of the total ppm of magnesium in the lubricating oil composition to the total TBN of the lubricating oil composition in mg KOH/g of the lubricating oil composition, measured by the method of ASTM D-2896, is greater than 25.

7. The lubricating oil composition of claim 3, wherein the a ratio of the total ppm of magnesium in the lubricating oil composition to the total TBN of the lubricating oil composition in mg KOH/g of the lubricating oil composition, measured by the method of ASTM D-2896, is from 30-90.

8. The lubricating oil composition of claim 2, wherein the ratio of the total ppm of calcium in the lubricating oil composition to the total TBN of the lubricating oil composition in mg KOH/g of the lubricating oil composition, measured by the method of ASTM D-2896, is less than 215.

9. The lubricating oil composition of claim 2, wherein the ratio of the total ppm of calcium in the lubricating oil composition to the total TBN of the lubricating oil composition in mg KOH/g of the lubricating oil composition, measured by the method of ASTM D-2896, is from 125-210.

10. The lubricating oil composition of claim 3, wherein the amount of one or more overbased calcium-containing detergents provides greater than 1000 ppm to less than 2000 ppm calcium to the lubricating oil composition.

11. The lubricating oil composition of claim 3, wherein the amount of one or more overbased calcium-containing detergents provides from 1050 ppm to 1900 ppm calcium to the lubricating oil composition.

12. The lubricating oil composition of claim 3, wherein the one or more overbased magnesium-containing detergents provide 100-1200 ppm of magnesium to the lubricating oil composition.

13. The lubricating oil composition of claim 3, wherein the one or more overbased magnesium-containing detergents provide 200-800 ppm of magnesium to the lubricating oil composition.

14. The lubricating oil composition of claim 1, wherein the boron is present in the lubricating oil composition in an amount of from 150 to 600 ppm, based on a total weight of the lubricating oil composition.

15. The lubricating oil composition of claim 2, wherein the one or more overbased calcium sulfonate detergents has a total base number of at least 250 mg KOH/g.

16. The lubricating oil composition of claim 1, wherein the lubricating oil composition has a total base number of less than 10 mg KOH/g of the lubricating oil composition, as measured by the method of ASTM D-2896.

17. The lubricating oil composition of claim 1, wherein the TBN contributed to the lubricating oil composition by the one or more calcium-containing detergents is from 2.5-5.0 mg KOH/g of the lubricating oil composition, as measured by the method of ASTM D-2896.

18. The lubricating oil composition of claim 1, wherein the TBN contributed to the lubricating oil composition by a combination of the one or more calcium-containing detergents and the one or more magnesium-containing detergents is from 4.0-8.0 mg KOH/g of the lubricating oil composition, as measured by the method of ASTM D-2896.

19. The lubricating oil composition of claim 1, further comprising one or more components selected from the group consisting of friction modifiers, antiwear agents, dispersants, antioxidants, and viscosity index improvers.

20. The lubricating oil composition of claim 1, wherein the greater than 50 wt.% of the base oil is selected from the group consisting of Group II, Group III, Group IV, Group V base oils, and a combination of two or more of the foregoing, and wherein the greater than 50 wt.% of the base oil is other than diluent oils that arise from provision of additive components or viscosity index improvers to the lubrication oil composition.

21. A method for reducing a number of low-speed pre-ignition events in a boosted internal combustion engine comprising steps of:

lubricating a boosted internal combustion engine with a lubricating oil composition as claimed in claim 1, and

operating the engine lubricated with the lubricating oil composition.

22. The method of claim 21, wherein the lubricating step lubricates a combustion chamber or cylinder walls of a spark-ignited direct injection engine provided with a turbocharger or a supercharger or a spark-ignited port fuel injection internal combustion engine provided with a turbocharger or a supercharger.

23. The method of claim 22, further comprising a step of measuring the number of low-speed pre-ignition events of the internal combustion engine lubricated with the lubricating oil composition.

24. The lubricating oil composition of claim 1, wherein the lubricating oil composition is an engine oil composition effective to reduce the number of low-speed pre-ignition events by more than 60% relative to the number of low-speed pre-ignition events in the same engine lubricated with reference lubricating oil R-1, as determined in in a Ford 2.0 Liter, 4 cylinder EcoBoost turbocharged gasoline direct injection engine operated for 4 hours under steady state conditions at a speed of about 1750 rpm and greater than 80% maximum brake mean effective pressure for four 4-hour stages of 175,000 engine cycles per stage; and

the engine oil composition passes the Ball Rust test,

wherein R-1 is formulated from about 80.7 wt.% of a Group III base oil, 12.1 wt.% of passenger car motor oil additive package and 7.2 wt.% of a 35 SSI ethylene/propylene copolymer viscosity index improver, wherein the passenger car motor oil additive package is an API SN, ILSAC-GF-5, and ACEA A5/B5 qualified DI package and R-1 also showed the following properties and partial elemental analysis:

| | |
|---|---|
| 10.9 | Kinematic Viscosity at 100°C, ($mm^2$/sec) |
| 3.3 | TBS, APPARENT_VISCOSITY, cPa |
| 2438 | calcium (ppmw) |
| < 10 | magnesium (ppmw) |

| | |
|---|---|
| 80 | molybdenum (ppmw) |
| 772 | phosphorus (ppmw) |
| 855 | zinc (ppmw) |
| 9.0 | Total Base Number ASTM D-2896 (mg KOH/g) |
| 165 | Viscosity Index |

25. The engine oil composition of claim 24, wherein the engine oil composition is effective to reduce the number of low-speed pre-ignition events greater than 70% relative to the number of low-speed pre-ignition events in the same engine lubricated with said reference lubricating oil R-1.