

CLAIMS

1. A lubricating oil composition comprising:
a base oil;
a primary antioxidant comprising alkylated diphenylamines having an alkyl group derived from a propylene tetramer; and
a sulfonate detergent.
2. The lubricating oil composition of claim 1, further comprising:
a secondary antioxidant comprising a dithiocarbamate, a hindered phenol, or a molybdenum succinimide.
3. The lubricating oil composition of claim 1, wherein at least 50% of the alkyl group of the alkylated diphenylamine have a carbon number between 10 and 15.
4. The lubricating oil composition of claim 1, wherein the sulfonate detergent is a petroleum-based detergent or a synthetic detergent.
5. The lubricating oil composition of claim 1, wherein the primary antioxidant is present in 0.01 wt % to 20 wt % of the lubricating oil composition.
6. The lubricating oil composition of claim 1, wherein the sulfonate detergent is overbased.
7. The lubricating oil composition of claim 1, wherein the secondary antioxidant is present in 0.01 wt % to 20 wt % of the lubricating oil composition.
8. The lubricating oil of claim 1, wherein the sulfonate detergent is present in 0.01 wt % to 10 wt % of the lubricating oil composition.

9. The lubricating oil composition of claim 1, further comprising:
an antioxidant, an ashless dispersant, an anti-wear agent, a detergent, a rust inhibitor, a dehazing agent, a demulsifying agent, a friction modifier, a metal deactivating agent, a pour point depressant, a viscosity modifier, an antifoaming agent, a co-solvent, a package compatibilizer, a corrosion-inhibitor, a dye, or an extreme pressure agent.
10. The lubricating oil composition of claim 1, wherein the sulfonate detergent includes an internal olefin sulfonate, an alkyl ether sulfonate, an alcohol ether sulfonate, a linear alkyl aryl sulfonate, or an alkane sulfonate.
11. A method of improving oxidation stability of a lubricating oil, the method comprising:
supplying to an engine a lubricating oil composition comprising:
a base oil;
a primary antioxidant comprising alkylated diphenylamines having an alkyl group derived from propylene tetramer; and
a sulfonate detergent.
12. The method of claim 11, wherein the lubricating oil composition further comprises:
a secondary antioxidant comprising a dithiocarbamate, a hindered phenol, or a molybdenum succinimide.
13. The method of claim 11, at least 50% of the alkylated diphenylamines have a carbon number between 10 and 15.

14. The method of claim 11, wherein the sulfonate detergent is a petroleum-based detergent or a synthetic detergent.
15. The method of claim 11, wherein the primary antioxidant is present in 0.01 wt % to 20 wt % of the lubricating oil composition.
16. The method of claim 11, wherein the sulfonate detergent is overbased.
17. The method of claim 11, wherein the secondary antioxidant is present in 0.01 wt % to 20 wt % of the lubricating oil composition.
18. The method of claim 11, wherein the sulfonate detergent is present in 0.01 wt % to 10 wt % of the lubricating oil composition.
19. The method of claim 11, wherein the lubricating oil composition further comprises:
an antioxidant, an ashless dispersant, an anti-wear agent, a detergent, a rust inhibitor, a dehazing agent, a demulsifying agent, a friction modifier, a metal deactivating agent, a pour point depressant, a viscosity modifier, an antifoaming agent, a co-solvent, a package compatibilizer, a corrosion-inhibitor, a dye, or an extreme pressure agent.
20. The method of claim 11, wherein the sulfonate detergent includes an internal olefin sulfonate, an alkyl ether sulfonate, an alcohol ether sulfonate, a linear alkyl aryl sulfonate, or an alkane sulfonate.