CLAIMS

1. A lubricating oil comprising:

a base oil; and

an anti-degradation additive comprising nanocapsules having an average particle size of about 1 nm to about 500 nm;

the nanocapsules having a core of a neutralizing material and a polymeric encapsulant configured to release the neutralizing material in an acidic environment,

the encapsulant comprising a pyridine-containing polyurethane, a pyridine-containing polyurea, or a combination comprising at least one of the foregoing, and

the neutralizing material comprising a C_{10-20} amine, a C_{10-20} alcohol, or a combination comprising at least one of the foregoing.

2. The lubricating oil of claim 1, comprising up to about 30 volume percent of the anti-degradation additive.

3. The lubricating oil of claim 1, wherein the anti-degradation additive comprises nanocapsules having an average particle size of about 10 nm to 250 nm.

4. The lubricating oil of claim 1, wherein the lubricating oil has a dynamic viscosity of about 1 cP to about 2,000 cP at 23^{o}C.

5. A method of reducing degradation of a lubricating oil in a downhole environment, the method comprising:

adding to a base oil an anti-degradation additive comprising nanocapsules having an average particle size of about 1 nm to about 500 nm;

the nanocapsules having a core of a neutralizing material and a polymeric encapsulant configured to release the neutralizing material in an acidic environment,

the polymeric encapsulant comprising, a pyridine-containing polyurethane, a pyridine-containing polyurea, or a combination comprising at least one of the foregoing, and

the neutralizing material comprising a C_{10-20} amine, a C_{10-20} alcohol, or a combination comprising at least one of the foregoing.

6. The method of claim 5,

wherein the polymeric encapsulant comprises the pyridine-containing polyurethane, and the method further comprises:

breaking a hydrogen bond between the nitrogen atom of a pyridine and the H atom of a H-N- moiety on the polyurethane; and

releasing the neutralizing material from the polymeric encapsulant comprising the pyridine-containing polyurethane.

7. The method of claim 5, further comprising neutralizing an acidic byproduct generated from the lubricating oil during use with the neutralizing material released from the polymeric encapsulant.

8. The method of claim 5, wherein the lubricating oil comprises up to about 30 volume percent of the anti-degradation additive, based on the total volume of the lubricating oil.

9. An engine lubricating system comprising:

a circulation system for providing a continuing flow of a lubricating oil to an internal combustion engine; and

a lubricating oil disposed within the circulation system,

the lubricating oil comprising a base oil; and

an anti-degradation additive comprising nanocapsules having an average particle size of about 1 nm to about 500 nm;

the nanocapsules having a core of a neutralizing material and a polymeric encapsulant configured to release the neutralizing material in an acidic environment,

the polymeric encapsulant comprising, a pyridine-containing polyurethane, a pyridine-containing polyurea, or a combination comprising at least one of the foregoing, and

the neutralizing material comprising a C_{10-20} amine, a C_{10-20} alcohol, or a combination comprising at least one of the foregoing.

10. An electric motor, comprising:

a rotatable shaft;

a stator;

a rotor disposed within the stator and spaced from the stator by a running clearance therebetween, the rotor configured for rotation of the shaft; and

a lubricating oil disposed in the running clearance, the lubricating oil comprising a base oil an anti-degradation additive comprising nanocapsules having an average particle size of about 1 nm to about 500 nm;

the nanocapsules having a core of a neutralizing material and a polymeric encapsulant configured to release the neutralizing material in an acidic environment,

wherein the neutralizing material comprises a C_{10-20} amine, a C_{10-20} alcohol, or a combination comprising at least one of the foregoing, and

the polymeric encapsulant comprises, a pyridine-containing polyurethane, a pyridine-containing polyurea, or a combination comprising at least one of the foregoing.

11. The lubricating oil of claim 1, wherein the nanocapsules have a core/shell structure, and a thickness of the shell is about 10 nm to about 50 nm.

12. The lubricating oil of claim 1, wherein the thickness of the shell is about 5 nm to about 15 nm.

13. The lubricating oil of claim 1, wherein the polymeric encapsulant comprises a pyridine-containing polyurethane.

14. The lubricating oil of claim 1, wherein the polymeric encapsulant comprises a pyridine- containing polyurea.

15. The lubricating oil of claim 1, comprising about 0.01 to about 15 volume percent of the anti-degradation additive, based on the total volume of the lubricating oil.