WHAT IS CLAIMED IS:

1. A lubricating oil composition for battery electrical vehicles (BEVs), hybrid vehicles (HVs) and plug-in hybrid vehicles (PHVs) with electric motors and/or generators comprising:

a. a major amount of an oil of lubricating viscosity having a kinematic viscosity at 100°C in a range of 1.5 to 20 mm^2/s;

b. a phosphorus antiwear additive selected from inorganic phosphorus acids, acidic or neutral phosphite esters, acidic or neutral phosphate esters and their amine salts, or combinations thereof;

c. a nitrogen-based corrosion inhibitor, wherein the total amount of nitrogen provided by the corrosion inhibitor to the lubricating oil composition is no more than 125 ppm based of the weight of the lubricating oil composition.

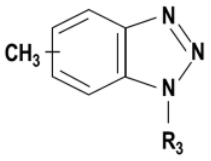
d. a sulfur EP additive, wherein the total amount of sulfur provided by the sulfur EP additive to the lubricating oil composition is 300 to 1500 ppm based of the weight of the lubricating oil composition,

wherein the lubricating oil composition contains less than 50 ppm of metals and has a volume resistivity greater than 1.0 x $10^9 \Omega \cdot cm$ at 80°C.

2. The lubricating oil composition of claim 1, wherein the phosphorus antiwear additive is a phosphite ester, a phosphate amine, phosphoric acid, or combinations thereof.

3. The lubricating oil composition of claim 2, wherein the phosphorus antiwear additive provides from 100 to 1000 ppm phosphorus to the lubricating oil composition.

4. The lubricating oil composition of claim 1, wherein the corrosion inhibitor has the following structure:

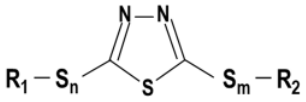


(VI),

wherein R_3 is a hydrogen or a hydrocarbyl group comprising 1 to 20 carbon atoms which optionally contain an oxygen, sulfur, or nitrogen atom.

5. The lubricating oil composition of claim 1, wherein the corrosion inhibitor is an alkylated benzotriazole compound, a benzotriazole compound, or combinations thereof.

6. The lubricating oil composition of claim 1, wherein the total amount of nitrogen provided by the corrosion inhibitor to the lubricating oil composition is from 20 to 125 ppm based of the weight of the lubricating oil composition.
7. The lubricating oil composition of claim 1, wherein the sulfur EP additive has the following structure:



(V),

wherein R_1 and R_2 are each independently hydrogen atom or a hydrocarbyl moiety comprising 6 to 18 carbon atoms, m is 2, and n = 2.

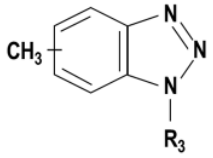
8. The lubricating oil composition of claim 1, wherein the sulfur EP additive is a branched dialkyl thiadiazole compound, a linear dialkyl thiadiazole compound, or combinations thereof.
9. The lubricating oil composition of claim 1, wherein the total amount of sulfur provided by the sulfur EP additive to the lubricating oil composition is from 300 to 1200 ppm based of the weight of the lubricating oil composition.
10. A method of reducing corrosion and improving wear protection in the transmission systems of battery electrical vehicles (BEVs), hybrid vehicles (HVs) and plug-in hybrid vehicles (PHVs) with electric motors and/or generators comprising lubricating and operating said transmission system with a lubricating oil composition comprising:
    a. a major amount of an oil of lubricating viscosity having a kinematic viscosity at 100°C in a range of 1.5 to 20 mm^2/s;
    b. a phosphorus antiwear additive selected from inorganic phosphorus acids, acidic or neutral phosphite esters, acidic or neutral phosphate esters and their amine salts, or combinations thereof;
    c. a nitrogen-based corrosion inhibitor, wherein the total amount of nitrogen provided by the corrosion inhibitor to the lubricating oil composition is no more than 125 ppm based of the weight of the lubricating oil composition.
    d. a sulfur EP additive, wherein the total amount of sulfur provided by the sulfur EP additive to the lubricating oil composition is 300 to 1500 ppm based of the weight of the lubricating oil composition,

wherein the lubricating oil composition contains less than 50 ppm of metals and has a volume resistivity greater than 1.0 x $10^9 \Omega \cdot cm$ at 80°C.

11. The method of claim 10, wherein the phosphorus antiwear additive is a phosphate ester, a phosphate amine, phosphoric, or combinations thereof.

12. The method of claim 11, wherein the phosphorus antiwear additive provides from 100 to 1000 ppm phosphorus to the lubricating oil composition.

13. The method of claim 10, wherein the corrosion inhibitor has the following structure:



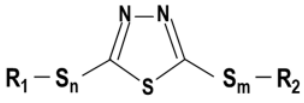
(VI),

wherein R_3 is a hydrogen or a hydrocarbyl group comprising 1 to 20 carbon atoms which optionally contain an oxygen, sulfur, or nitrogen atom.

14. The method of claim 10, wherein the corrosion inhibitor is an alkylated benzotriazole compound, a benzotriazole compound, or combinations thereof.

15. The method of claim 10, wherein the total amount of nitrogen provided by the corrosion inhibitor to the lubricating oil composition is from 20 to 125 ppm based of the weight of the lubricating oil composition.

16. The method of claim 10, wherein the sulfur EP additive has the following structure:



(V),

wherein R_1 and R_2 are each independently hydrogen atom or a hydrocarbyl moiety comprising 6 to 18 carbon atoms, m is 2, and n = 2.

17. The method of claim 10, wherein the sulfur EP additive is a branched dialkyl thiadiazole compound, a linear dialkyl thiadiazole compound, or combinations thereof.

18. The method of claim 10, wherein the total amount of sulfur provided by the sulfur EP additive to the lubricating oil composition is from 300 to 1200 ppm based of the weight of the lubricating oil composition.