SUMMARY AND TERMS

In one aspect, the present disclosure relates to use of a lubricating composition for providing a balance between catalytic converter life, efficiency and wear in an internal combustion engine of a hybrid vehicle, wherein the internal combustion engine of the hybrid vehicle is operated at a temperature of 100°C or less, comprising lubricating the internal combustion engine of the hybrid vehicle with a lubricating oil composition comprising:

greater than 50 wt.% of a base oil of lubricating viscosity; and

an amount of one or more zinc dialkyl dithiophosphate compound(s) sufficient to provide:

from 100 ppmw phosphorus to 1000 ppmw phosphorus, based on a total weight of the lubricating oil composition; and

from 10 ppmw zinc to 1200 ppmw zinc, based on the total weight of the lubricating oil composition,

wherein the one or more zinc dialkyl dithiophosphate compounds are derived from one or more primary alkyl alcohol(s), one or more secondary alkyl alcohol(s), or combinations thereof

In a first example, the present disclosure relates to a method for improving phosphorus retention in an internal combustion engine of a hybrid vehicle. The method includes lubricating the internal combustion engine of the hybrid vehicle with a lubricating oil composition including:

greater than 50 wt.% of a base oil of lubricating viscosity; and

an amount of one or more zinc dialkyl dithiophosphate compound(s) sufficient to provide:

from about 100 ppmw phosphorus to about 1000 ppmw phosphorus, based on a total weight of the lubricating oil composition; and

from about 10 ppmw zinc to about 1200 ppmw zinc, based on the total weight of the lubricating oil composition,

wherein the one or more zinc dialkyl dithiophosphate compounds are derived from one or more primary alkyl alcohol(s), one or more secondary alkyl alcohol(s), or combinations thereof.

In the foregoing method, the phosphorus retention may be sufficient to reduce catalyst poisoning relative to a same lubricating oil composition without the one or more zinc dialkyl dithiophosphate compounds.

In each of the foregoing methods, the internal combustion engine of the hybrid vehicle may be operated at a temperature of 100^0C or less, or from about 70^0C to about 100^0C.

In each of the foregoing methods, the one or more zinc dialkyl dithiophosphate compound(s) may be derived from one or more primary alkyl alcohol(s) each having an alkyl group with 3 to 8 carbon atoms.

In each of the foregoing methods, the alkyl group of the one or more primary alkyl alcohol(s) may have branching at the beta carbon relative to the hydroxyl group.

In each of the foregoing methods, the one or more zinc dialkyl dithiophosphate compound(s) is derived from one or more primary alkyl alcohol selected from the group consisting of n-propyl alcohol, isopropyl alcohol, isobutyl alcohol, n-butyl alcohol, 2-butanol, n-penyl alcohol, hexanol, methyl isobutyl carbinol, isohexanol, n-heptanol, isoheptanol, octanol, amyl alcohol, and 2-ethylhexanol.

In each of the foregoing methods, the one or more zinc dialkyl dithiophosphate compound(s) may be derived from two or more primary alkyl alcohols.

In each of the foregoing methods, the one or more zinc dialkyl dithiophosphate compound(s) may be derived the one or more secondary alkyl alcohol(s) having an alkyl group with 3 to 8 carbon atoms.

In each of the foregoing methods, the one or more zinc dialkyl dithiophosphate compound(s) may be derived from a secondary alkyl alcohol selected from the group consisting of isopropyl alcohol, amyl alcohol, and methyl isobutyl carbinol.

In each of the foregoing methods, the one or more zinc dialkyl dithiophosphate compound(s) may be derived from two or more secondary alkyl alcohols.

In each of the foregoing methods, the one or more zinc dialkyl dithiophosphate compound(s) may be derived from a weight ratio of the one or more primary alkyl alcohol(s) to the one or more secondary alkyl alcohol(s) of from 100:20 to 50:50.

In each of the foregoing methods, the one or more zinc dialkyl dithiophosphate compound(s) may be a zinc to phosphorus weight ratio of from 1.08 to 1.3.

In each of the foregoing methods, wherein the one or more zinc dialkyl dithiophosphate compound(s) may comprise an average number of total carbon atoms per mole of phosphorus of from about 5 to about 30, or from about 8 to about 20.

In each of the foregoing methods, the lubricating oil composition may further comprise a calcium-sulfonate detergent. The calcium-sulfonate detergent may comprise an overbased calcium-sulfonate detergent and/or a low-based/neutral calcium-sulfonate detergent. The lubricating oil composition may comprise from about 500 ppmw to about 2000 ppmw calcium from the calcium-sulfonate detergent, based on a total weight of the lubricating oil composition.

In each of the foregoing methods, the lubricating oil composition may comprise a borated succinimide dispersant.

In each of the foregoing methods, the lubricating oil composition may further comprise a succinimide dispersant. In some examples, the succinimide dispersant is a borated succinimide. Preferably, the borated succinimide is present in an amount of from about 5 ppmw to about 300 ppmw.

In each of the foregoing methods, the lubricating oil composition may further comprise one or more components selected from the group consisting of organic friction modifier(s), molybdenum-containing compound(s), calcium sulfonate detergent(s), antioxidant(s), antifoam agent(s), pour point depressant(s), and viscosity index improver(s).

In one aspect, the present disclosure relates to use of a lubricating oil composition for reducing wear in an internal combustion engine of a hybrid vehicle, wherein the internal combustion engine of the hybrid vehicle is operated at a temperature of 100°C or less, comprising lubricating the internal combustion engine of the hybrid vehicle with a lubricating oil composition comprising:

greater than 50 wt.% of a base oil of lubricating viscosity; and

an amount of one or more zinc dialkyl dithiophosphate compound(s) sufficient to provide: from 100 ppmw phosphorus to 1000 ppmw phosphorus, based on a total weight of the lubricating oil composition, and

from 10 ppmw zinc to 1200 ppmw zinc, based on the total weight of the lubricating oil composition; and

wherein the one or more zinc dialkyl dithiophosphate compounds are derived from 100 mole % of one or more primary alkyl alcohol(s).

In a second example, the disclosure relates to a method for reducing wear in an internal combustion engine of a hybrid vehicle comprising lubricating the internal combustion engine of the hybrid vehicle with a lubricating oil composition comprising:

greater than 50 wt.% of a base oil of lubricating viscosity; and

an amount of one or more zinc dialkyl dithiophosphate compound(s) sufficient to provide:

from about 100 ppmw phosphorus to about 1000 ppmw phosphorus, based on a total weight of the lubricating oil composition, and

from about 10 ppmw zinc to about 1200 ppmw zinc, based on the total weight of the lubricating oil composition.

In the second example, the one or more zinc dialkyl dithiophosphate compounds may be derived from 100 mole % of one or more primary alkyl alcohol(s).

In each of the foregoing second examples, the one or more zinc dialkyl dithiophosphate compound(s) may have a zinc to phosphorus weight ratio of from 1.20 and greater, or from about 1.20 to about 5, or from about 1.27 and greater.

In each of the foregoing second examples, the internal combustion engine of the hybrid vehicle may be operated at a temperature of 100^0C or less.

In each of the foregoing second examples, the one or more zinc dialkyl dithiophosphate compound(s) may be derived from the one or more primary alkyl alcohol(s) having an alkyl group with 3 to 9 carbon atoms.

In each of the foregoing second examples, the one or more zinc dialkyl dithiophosphate compound(s) may comprise an average number of total carbon atoms per mole of phosphorus of from about 8 to about 30, or from about 12 to about 20.

In each of the foregoing second examples, the alkyl group of the one or more primary alkyl alcohol(s) may have branching at the beta carbon relative to the hydroxyl group.

In each of the foregoing second examples, the one or more zinc dialkyl dithiophosphate compound(s) may be derived from one or more primary alkyl alcohol(s) selected from the group consisting of n-propyl alcohol, isopropyl alcohol, n-butyl alcohol, 2-butanol, n-penyl alcohol, hexanol, methyl isobutyl carbinol, isohexanol, n-heptanol, isoheptanol, octanol, isobutyl alcohol, amyl alcohol, and 2-ethylhexanol.

In each of the foregoing second examples, the one or more zinc dialkyl dithiophosphate compound(s) may be derived from two or more primary alkyl alcohols.

In each of the foregoing second examples, the one or more zinc dialkyl dithiophosphate compound(s) may be overbased with zinc oxide.

In each of the foregoing second examples, the lubricating oil composition may further comprise a calcium-sulfonate detergent. The calcium-sulfonate detergent may comprise an overbased calcium-sulfonate detergent and/or a low-based/neutral calcium-sulfonate detergent. The lubricating oil composition may comprise from about 500 ppmw to about 2000 ppmw calcium from the calcium-sulfonate detergent, based on a total weight of the lubricating oil composition.

In each of the foregoing second examples, the lubricating oil composition may further comprise a succinimide dispersant. In some examples, the succinimide dispersant is a borated succinimide dispersant. In some examples, the lubricating oil composition comprises about 5 ppmw of boron to about 300 ppmw of boron from the borated succinimide dispersant.

In each of the foregoing second examples, the lubricating oil composition may further comprise one or more components selected from the group consisting of organic friction modifier(s), molybdenum-containing compound(s) calcium sulfonate detergent(s), antioxidant(s), antifoam agent(s), pour point depressant(s), and viscosity index improver(s).

In a third example, the disclosure relates to a lubricating oil composition for use in an internal combustion engine of a hybrid vehicle, comprising:

greater than 50 wt.% of a base oil of lubricating viscosity; and

an amount of one or more zinc dialkyl dithiophosphate compound(s) sufficient to provide:

from about 100 ppmw phosphorus to about 1000 ppmw phosphorus, based on a total weight of the lubricating oil composition, and

from about 10 ppmw zinc to about 1200 ppmw zinc, based on the total weight of the lubricating oil composition.

In another aspect, the present disclosure relates to a lubricating oil composition for use in an internal combustion engine of a hybrid vehicle, and the internal combustion engine of the hybrid vehicle is operated at a temperature of 100°C or less, comprising:

greater than 50 wt.% of a base oil of lubricating viscosity; and

an amount of one or more zinc dialkyl dithiophosphate compound(s) sufficient to provide:

from 100 ppmw phosphorus to 1000 ppmw phosphorus, based on a total weight of the lubricating oil composition, and

from 10 ppmw zinc to 1200 ppmw zinc, based on the total weight of the lubricating oil composition,

wherein the one or more zinc dialkyl dithiophosphate compounds are derived from one or more primary alkyl alcohol(s), one or more secondary alkyl alcohol(s), or combinations thereof and wherein the one or more zinc dialkyl dithiophosphate compound(s) is derived from a molar ratio of the one or more primary alkyl alcohol(s) to the one or more secondary alkyl alcohol(s) of form 100:20 to 50:50, wherein the one or more zinc dialkyl dithiophosphate compound(s) has a zinc to phosphorous weight ratio of 1.20 or greater.

In the third example, the one or more zinc dialkyl dithiophosphate compounds may be derived from one or more primary alkyl alcohol(s), one or more secondary alkyl alcohol(s), or combinations thereof and wherein the one or more zinc dialkyl dithiophosphate compound(s) is derived from a weight ratio of the one or more primary alkyl alcohol(s) to the one or more secondary alkyl alcohol(s) of form 100:20 to 50:50. The one or more zinc dialkyl dithiophosphate compound(s) may have a zinc to phosphorus weight ratio of from 1.08 to 1.3.

In each of the foregoing third examples, the lubricating oil composition may be configured for use in an internal combustion engine of the hybrid vehicle that is operated at a temperature of 100^0C or less.

In each of the foregoing third examples, the lubricating oil composition may further comprise a calcium-sulfonate detergent. The calcium-sulfonate detergent may comprise an overbased calcium-sulfonate detergent and/or a low-based/neutral calcium-sulfonate detergent. The lubricating oil composition may comprise from about 500 ppmw to about 2000 ppmw calcium from the calcium-sulfonate detergent, based on a total weight of the lubricating oil composition.

In each of the foregoing third examples, the lubricating oil composition may further comprise a succinimide dispersant. In some examples, the succinimide dispersant is a borated

succinimide dispersant. In some examples, the lubricating oil composition comprises about 5 ppmw of boron to about 300 ppmw of boron from the borated succinimide dispersant.

In each of the foregoing third examples, the lubricating oil composition may further comprise one or more components selected from the group consisting of organic friction modifier(s), molybdenum-containing compound(s) calcium sulfonate detergent(s), antioxidant(s), antifoam agent(s), pour point depressant(s), and viscosity index improver(s).

The following definitions of terms are provided in order to clarify the meanings of certain terms as used herein.

The terms “oil composition,” “lubrication composition,” “lubricating oil composition,” “lubricating oil,” “lubricant composition,” “lubricating composition,” “fully formulated lubricant composition,” “lubricant,” “crankcase oil,” “crankcase lubricant,” “engine oil,” “engine lubricant,” “motor oil,” and “motor lubricant” are considered synonymous, fully interchangeable terminology referring to the finished lubrication product comprising a major amount of a base oil plus a minor amount of an additive composition.

As used herein, the terms “additive package,” “additive concentrate,” “additive composition,” “engine oil additive package,” “engine oil additive concentrate,” “crankcase additive package,” “crankcase additive concentrate,” “motor oil additive package,” “motor oil concentrate,” are considered synonymous, fully interchangeable terminology referring the portion of the lubricating oil composition excluding the major amount of base oil stock mixture. The additive package may or may not include the viscosity index improver or pour point depressant.

The term “overbased” relates to metal salts, such as metal salts of sulfonates, carboxylates, salicylates, and/or phenates, wherein the amount of metal present exceeds the stoichiometric amount. Such salts may have a conversion level in excess of 100% (i.e., they may comprise more than 100% of the theoretical amount of metal needed to convert the acid to its “normal,” “neutral” salt). The expression “metal ratio,” often abbreviated as MR, is used to designate the ratio of total chemical equivalents of metal in the overbased salt to chemical equivalents of the metal in a neutral salt according to known chemical reactivity and stoichiometry. In a normal or neutral salt, the metal ratio is one and in an overbased salt, MR, is greater than one. They are commonly referred to as overbased, hyperbased, or superbased salts and may be salts of organic sulfur acids, carboxylic acids, salicylates, and/or phenols.

As used herein, the term "hydrocarbyl substituent" or "hydrocarbyl group" is used in its ordinary sense, which is well-known to those skilled in the art. Specifically, it refers to a group having a carbon atom directly attached to the remainder of the molecule and having a predominantly hydrocarbon character. Each hydrocarbyl group is independently selected from

Lubricants, combinations of components, or individual components of the present description may be suitable for use in hybrid vehicles. Hybrid vehicles include various types of internal combustion engines which are used in combination with an electrical or battery source of power. The engines of hybrid vehicles typically operate at a temperature of less than 100ºC, compared to typical internal combustion engines which operate at around 150ºC. Suitable engine types may include, but are not limited to heavy duty diesel, passenger car, or light duty diesel. The internal combustion engine may be a diesel fueled engine, a gasoline fueled engine, a natural gas fueled engine, a bio-fueled engine, a mixed diesel/biofuel fueled engine, a mixed gasoline/biofuel fueled engine, an alcohol fueled engine, a mixed gasoline/alcohol fueled engine, a compressed natural gas (CNG) fueled engine, or mixtures thereof. A diesel engine may be a compression ignited engine. A gasoline engine may be a spark-ignited engine. The internal combustion engine may be a 2-stroke, 4-stroke, or rotary engine. Suitable internal combustion engines include aviation piston engines, low-load diesel engines, and motorcycle, automobile, and truck engines.

The internal combustion engine may contain components of one or more of an aluminum-alloy, lead, tin, copper, cast iron, magnesium, ceramics, stainless steel, composites, and/or mixtures thereof. The components may be coated, for example, with a diamond-like carbon coating, a lubrited coating, a phosphorus-containing coating, molybdenum-containing coating, a graphite coating, a nano-particle-containing coating, and/or mixtures thereof. The aluminum-alloy may include aluminum silicates, aluminum oxides, or other ceramic materials. In one example the aluminum-alloy is an aluminum-silicate surface. As used herein, the term “aluminum alloy” is intended to be synonymous with “aluminum composite” and to describe a component or surface comprising aluminum and another component intermixed or reacted on a microscopic or nearly microscopic level, regardless of the detailed structure thereof. This would include any conventional alloys with metals other than aluminum as well as composite or alloy-like structures with non-metallic elements or compounds such with ceramic-like materials.

The lubricating oil composition for an internal combustion engine may be suitable for any engine lubricant irrespective of the sulfur, phosphorus, or sulfated ash (ASTM D-874) content. The sulfur content of the engine oil lubricant may be about 1 wt.% or less, or about 0.8 wt.% or less, or about 0.5 wt.% or less, or about 0.3 wt.% or less, or about 0.2 wt.% or less. In one example the sulfur content may be in the range of about 0.001 wt.% to about 0.5 wt.%, or about 0.01 wt.% to about 0.3 wt.%. The phosphorus content may be about 0.2 wt.% or less, or about 0.1 wt.% or less, or about 0.085 wt.% or less, or about 0.08 wt.% or less, or even about 0.06 wt.% or less, about 0.055 wt.% or less, or about 0.05 wt.% or less. In one example the phosphorus content may be about 50 ppm to about 1000 ppm, or about 325 ppm to about 850 ppm. The total sulfated ash

content may be about 2 wt.% or less, or about 1.5 wt.% or less, or about 1.1 wt.% or less, or about 1 wt.% or less, or about 0.8 wt.% or less, or about 0.5 wt.% or less. In one example the sulfated ash content may be about 0.05 wt.% to about 0.9 wt.%, or about 0.1 wt.% or about 0.2 wt.% to about 0.45 wt.%. In another example, the sulfur content may be about 0.4 wt.% or less, the phosphorus content may be about 0.08 wt.% or less, and the sulfated ash is about 1 wt.% or less. In yet another example the sulfur content may be about 0.3 wt.% or less, the phosphorus content is about 0.05 wt.% or less, and the sulfated ash may be about 0.8 wt.% or less.

In one example the lubricating oil composition is an engine oil, wherein the lubricating oil composition may have (i) a sulfur content of about 0.5 wt.% or less, (ii) a phosphorus content of about 0.1 wt.% or less, and (iii) a sulfated ash content of about 1.5 wt.% or less.

In some examples, the lubricating oil composition is suitable for use with engines powered by low sulfur fuels, such as fuels containing about 1 to about 5% sulfur. Highway vehicle fuels contain about 15 ppm sulfur (or about 0.0015% sulfur).

Low speed diesel typically refers to marine engines, medium speed diesel typically refers to locomotives, and high speed diesel typically refers to highway vehicles. The lubricating oil composition may be suitable for only one of these types or all.

Further, lubricants of the present description may be suitable to meet one or more industry specification requirements such as ILSAC GF-3, GF-4, GF-5, GF-6, PC-11, CF, CF-4, CH-4, CK-4, FA-4, CJ-4, CI-4 Plus, CI-4, API SG, SJ, SL, SM, SN, ACEA A1/B1, A2/B2, A3/B3, A3/B4, A5/B5, A7/B7 C1, C2, C3, C4, C5, C6, E4/E6/E7/E9, Euro 5/6,JASO DL-1, Low SAPS, Mid SAPS, or original equipment manufacturer specifications such as DexosTM 1, DexosTM 2, MB-Approval 229.1, 229.3, 229.5, 229.51/229.31, 229.52, 229.6, 229.71, 226.5, 226.51, 228.0/.1, 228.2/.3, 228.31, 228.5, 228.51, 228.61, VW 501.01, 502.00, 503.00/503.01, 504.00, 505.00, 505.01, 506.00/506.01, 507.00, 508.00, 509.00, 508.88, 509.99, BMW Longlife-01, Longlife-01 FE, Longlife-04, Longlife-12 FE, Longlife-14 FE+, Longlife-17 FE+, Porsche A40, C30, Peugeot Citroën Automobiles B71 2290, B71 2294, B71 2295, B71 2296, B71 2297, B71 2300, B71 2302, B71 2312, B71 2007, B71 2008, Renault RN0700, RN0710, RN0720, Ford WSS-M2C153-H, WSS-M2C930-A, WSS-M2C945-A, WSS-M2C913A, WSS-M2C913-B, WSS-M2C913-C, WSS-M2C913-D, WSS-M2C948-B, WSS-M2C948-A, GM 6094-M, Chrysler MS-6395, Fiat 9.55535 G1, G2, M2, N1, N2, Z2, S1, S2, S3, S4, T2, DS1, DSX, GH2, GS1, GSX, CR1, Jaguar Land Rover STJLR.03.5003, STJLR.03.5004, STJLR.03.5005, STJLR.03.5006, STJLR.03.5007, STJLR.51.5122 or any past or future PCMO or HDD specifications not mentioned herein. In some examples for passenger car motor oil (PCMO) applications, the amount of phosphorus in the finished fluid is 1000 ppm or less or 900 ppm or less or 800 ppm or less.

Other hardware may not be suitable for use with the disclosed lubricant. A "functional fluid" is a term which encompasses a variety of fluids including but not limited to tractor hydraulic fluids, power transmission fluids including automatic transmission fluids, continuously variable transmission fluids and manual transmission fluids, hydraulic fluids, including tractor hydraulic fluids, some gear oils, power steering fluids, fluids used in wind turbines, compressors, some industrial fluids, and fluids related to power train components. It should be noted that within each of these fluids such as, for example, automatic transmission fluids, there are a variety of different types of fluids due to the various transmissions having different designs which have led to the need for fluids of markedly different functional characteristics. This is contrasted by the term "lubricating fluid" which is not used to generate or transfer power.

With respect to tractor hydraulic fluids, for example, these fluids are all-purpose products used for all lubricant applications in a tractor except for lubricating the engine. These lubricating applications may include lubrication of gearboxes, power take-off and clutch(es), rear axles, reduction gears, wet brakes, and hydraulic accessories.

When the functional fluid is an automatic transmission fluid, the automatic transmission fluids must have enough friction for the clutch plates to transfer power. However, the friction coefficient of fluids has a tendency to decline due to the temperature effects as the fluid heats up during operation. It is important that the tractor hydraulic fluid or automatic transmission fluid maintain its high friction coefficient at elevated temperatures, otherwise brake systems or automatic transmissions may fail. This is not a function of an engine oil.

Tractor fluids, and for example Super Tractor Universal Oils (STUOs) or Universal Tractor Transmission Oils (UTTOs), may combine the performance of engine oils with transmissions, differentials, final-drive planetary gears, wet-brakes, and hydraulic performance. While many of the additives used to formulate a UTTO or a STUO fluid are similar in functionality, they may have deleterious effect if not incorporated properly. For example, some anti-wear and extreme pressure additives used in engine oils can be extremely corrosive to the copper components in hydraulic pumps. Detergents and dispersants used for gasoline or diesel engine performance may be detrimental to wet brake performance. Friction modifiers specific to quiet wet brake noise, may lack the thermal stability required for engine oil performance. Each of these fluids, whether functional, tractor, or lubricating, are designed to meet specific and stringent manufacturer requirements.

The present disclosure provides novel lubricating oil blends formulated for use as automotive crankcase lubricants. The present disclosure provides novel lubricating oil blends formulated for use as 2T and/or 4T motorcycle crankcase lubricants. Examples of the present

What is Claimed is:

1. Use of a lubricating composition for providing a balance between catalytic converter life, efficiency and wear in an internal combustion engine of a hybrid vehicle, wherein the internal combustion engine of the hybrid vehicle is operated at a temperature of 100°C or less, comprising lubricating the internal combustion engine of the hybrid vehicle with a lubricating oil composition comprising:

greater than 50 wt.% of a base oil of lubricating viscosity; and

an amount of one or more zinc dialkyl dithiophosphate compound(s) sufficient to provide:

from 100 ppmw phosphorus to 1000 ppmw phosphorus, based on a total weight of the lubricating oil composition; and

from 10 ppmw zinc to 1200 ppmw zinc, based on the total weight of the lubricating oil composition,

wherein the one or more zinc dialkyl dithiophosphate compounds are derived from one or more primary alkyl alcohol(s), one or more secondary alkyl alcohol(s), or combinations thereof.

2. The use of claim 1, wherein the one or more zinc dialkyl dithiophosphate compound(s) is derived from one or more primary alkyl alcohol(s) each having an alkyl group with 3 to 8 carbon atoms.

3. The use of any one of claims 1 - 2, wherein the one or more zinc dialkyl dithiophosphate compound(s) is derived the one or more secondary alkyl alcohol(s) having an alkyl group with 3 to 8 carbon atoms.

4. The use of any one of claims 1 - 3, wherein the one or more zinc dialkyl dithiophosphate compound(s) is derived from a molar ratio of the one or more primary alkyl alcohol(s) to the one or more secondary alkyl alcohol(s) of from 100:20 to 50:50.

5. The use of any one of claims 1 - 4, wherein the one or more zinc dialkyl dithiophosphate compound(s) has a zinc to phosphorus weight ratio of from 1.08 to 1.3.

6. The use of any one of claims 1 - 5, wherein the one or more zinc dialkyl dithiophosphate compound(s) comprises an average number of total carbon atoms per mole of phosphorus of from

5 to 30.

7. The use of any one of claims 1 - 6, wherein the lubricating oil composition comprises a borated succinimide dispersant.

8. Use of a lubricating oil composition for reducing wear in an internal combustion engine of a hybrid vehicle, wherein the internal combustion engine of the hybrid vehicle is operated at a temperature of 100°C or less, comprising lubricating the internal combustion engine of the hybrid vehicle with a lubricating oil composition comprising:

greater than 50 wt.% of a base oil of lubricating viscosity; and

an amount of one or more zinc dialkyl dithiophosphate compound(s) sufficient to provide: from 100 ppmw phosphorus to 1000 ppmw phosphorus, based on a total weight of the lubricating oil composition, and

from 10 ppmw zinc to 1200 ppmw zinc, based on the total weight of the lubricating oil composition; and

wherein the one or more zinc dialkyl dithiophosphate compounds are derived from 100 mole % of one or more primary alkyl alcohol(s).

9. The use of claim 8, wherein the one or more zinc dialkyl dithiophosphate compound(s) has a zinc to phosphorus weight ratio of from 1.20 and greater.

10. The use of any one of claims 8 - 9, wherein the one or more zinc dialkyl dithiophosphate compound(s) is derived from the one or more primary alkyl alcohol(s) having an alkyl group with 3 to 9 carbon atoms.

11. The use of any one of claims 8 - 10, wherein the one or more zinc dialkyl dithiophosphate compound(s) comprises an average number of total carbon atoms per mole of phosphorus of from 8 to 30, or from 12 to 20.

12. The use of any one of claims 8 - 11, wherein the alkyl group of the one or more primary alkyl alcohol(s) has branching at the beta carbon relative to the hydroxyl group.

13. The use of any one of claims 8 - 12, wherein the one or more zinc dialkyl dithiophosphate compound(s) is derived from the one or more primary alkyl alcohol(s) selected from the group consisting of n-propyl alcohol, isopropyl alcohol, n-butyl alcohol, 2-butanol, n-penyl alcohol,

hexanol, methyl isobutyl carbinol, isohexanol, n-heptanol, isoheptanol, octanol, isobutyl alcohol, amyl alcohol, and 2-ethylhexanol.

14. The use of any one of claims 8 - 13, wherein the one or more zinc dialkyl dithiophosphate compound(s) is derived from two or more primary alkyl alcohols.

15. The use of any one of claims 8 - 14, wherein the one or more zinc dialkyl dithiophosphate compound(s) is overbased with zinc oxide.

16. The use of any one of claims 1 - 15, wherein the lubricating oil composition further comprises a calcium-sulfonate detergent.

17. The use of claim 16, wherein the lubricating oil composition comprises from 500 ppmw to 2000 ppmw calcium from the calcium-sulfonate detergent, based on a total weight of the lubricating oil composition.

18. The use of any one of claims 1 - 17, wherein the lubricating oil composition comprises a succinimide dispersant.

19. The use of any one of claims 1 - 18, wherein the lubricating oil composition comprises a borated succinimide dispersant.

20. The use of any one of claims 1 - 19, wherein the lubricating oil composition further comprises an antioxidant.

21. The use of any one of claims 1 - 20, wherein the lubricating oil composition further comprises one or more components selected from the group consisting of organic friction modifier(s), molybdenum-containing compound(s), antioxidant(s), antifoam agent(s), pour point depressant(s), and viscosity index improver(s).

22. A lubricating oil composition for use in an internal combustion engine of a hybrid vehicle, and the internal combustion engine of the hybrid vehicle is operated at a temperature of 100°C or less, comprising:

greater than 50 wt.% of a base oil of lubricating viscosity; and

an amount of one or more zinc dialkyl dithiophosphate compound(s) sufficient to provide:

from 100 ppmw phosphorus to 1000 ppmw phosphorus, based on a total weight of the lubricating oil composition, and

from 10 ppmw zinc to 1200 ppmw zinc, based on the total weight of the lubricating oil composition,

wherein the one or more zinc dialkyl dithiophosphate compounds are derived from one or more primary alkyl alcohol(s), one or more secondary alkyl alcohol(s), or combinations thereof and wherein the one or more zinc dialkyl dithiophosphate compound(s) is derived from a molar ratio of the one or more primary alkyl alcohol(s) to the one or more secondary alkyl alcohol(s) of form 100:20 to 50:50, wherein the one or more zinc dialkyl dithiophosphate compound(s) has a zinc to phosphorous weight ratio of 1.20 or greater.

23. The lubricating oil of claim 22 wherein, the one or more zinc dialkyl dithiophosphate compounds is derived from one or more primary alkyl alcohol(s), one or more secondary alkyl alcohol(s), or combinations thereof.

24. The lubricating oil composition of any one of claims 22 - 23, wherein the one or more zinc dialkyl dithiophosphate compound(s) is derived from a molar ratio of the one or more primary alkyl alcohol(s) to the one or more secondary alkyl alcohol(s) of from 100:20 to 50:50.

25. The lubricating oil composition of any one of claims 22 - 24, wherein the one or more zinc dialkyl dithiophosphate compound(s) has a zinc to phosphorus molar ratio of from 1.08 to 1.3.

26. The lubricating oil composition of any one of claims 22 - 25, wherein the lubricating oil composition further comprises a calcium-sulfonate detergent.

27. The lubricating oi composition of claim 26, wherein the calcium-sulfonate detergent comprises an overbased calcium-sulfonate detergent and/or a low-based/neutral calcium-sulfonate detergent.

28. The lubricating oil composition of any one of claims 26-27, wherein the lubricating oil composition comprises from 500 ppmw to 2000 ppmw calcium from the calcium-sulfonate detergent, based on a total weight of the lubricating oil composition.

29. The lubricating oil composition of any one of claims 22 - 28, wherein the lubricating oil composition further comprises a succinimide dispersant.

30. The lubricating oil composition of any one of claims 22 - 29, wherein the lubricating oil composition comprises a borated succinimide dispersant.

31. The lubricating oil composition of claim 30, wherein the lubricating oil composition comprises 5 ppmw of boron to 300 ppmw of boron from the borated succinimide dispersant.

32. The lubricating oil composition of any one of claims 22 - 30, wherein the lubricating oil composition further comprises one or more components selected from the group consisting of organic friction modifier(s), molybdenum-containing compound(s) calcium sulfonate detergent(s), antioxidant(s), antifoam agent(s), pour point depressant(s), and viscosity index improver(s).