a base oil or a fully formulated lubricant; and

graphene nanoparticles derived from a carbon containing gas dispersed in the base oil or the fully formed lubricant;

and wherein the graphene nanoparticles are present at a concentration of from 0.001 wt% up to 0.01 wt% of the total weight of the lubricant composition.

[0007] In the disclosure, there is provided a method for preparing a lubricant composition comprising:

dispersing graphene nanoparticles derived from a carbon containing gas in a base oil or fully formulated lubricant.

[0007a] In another aspect of the disclosure, there is provided a method for preparing a lubricant composition comprising:

dispersing graphene nanoparticles derived from a carbon containing gas in a base oil or a fully formulated lubricant;

wherein the graphene nanoparticles are present at a concentration of from 0.001 wt% up to 0.01 wt% of the total weight of the lubricant composition.

[0008] In one example, the lubricant composition is a lubricant concentrate. In another example, the lubricant composition is a finished lubricant.

[0009] In an example, the graphene nanoparticles are present in an amount of from about 0.001 wt%. Preferably, the graphene nanoparticles are present in an amount of from about 0.01 wt%. More preferably, the graphene nanoparticles are present in an amount of from about 0.1 wt%. Even more preferably, the graphene nanoparticles are present in an amount of from about 1 wt%. Still more preferably, the graphene nanoparticles are present in an amount of from about 10 wt%.

[0010] In an example, the graphene nanoparticles are present in an amount of up to about 20 wt%. However, in some examples, the graphene nanoparticles are present in an amount of up to about 10 wt%, 2 wt%, 1 wt% or 0.01 wt%. For example, in one or more forms the composition may comprise graphene nanoparticles in an amount of: 0.001 wt% up 0.01 wt%, or 0.01wt% up to 1 wt% or, 0.1 wt% up to 1 wt%, or 1 wt% up 2 wt%, or 2 wt% up to 10 wt%, or 10wt% to 20wt%

[0011] The skilled person will appreciate that the weight proportion of graphene nanoparticles will depend on the intended application, and for example, whether the lubricant composition is in the form of a concentrate or a fully formulated lubricant.

[0012] In an example, the graphene is substantially free of metal and semi-metal impurities. In one form, the metal or semi-metal impurities are selected from the group

CLAIMS

1. A lubricant composition comprising:

a base oil or a fully formulated lubricant; and

graphene nanoparticles derived from a carbon containing gas dispersed in the base oil or the fully formed lubricant;

and wherein the graphene nanoparticles are present at a concentration of from 0.001 wt% up to 0.01 wt% of the total weight of the lubricant composition.

2. The lubricant composition of claim 1, wherein the lubricant composition is formed by dispersing the graphene nanoparticles in the base oil or fully formed lubricant using high-shear mixing.

3. The lubricant composition of any one of the preceding claims, wherein the graphene is substantially free of metal and semi-metal impurities selected from the group consisting of: Fe, Co, Cu, Mo, Ni, Si, and oxides thereof.

4. The lubricant composition of any one of the preceding claims, wherein the lubricant composition is substantially free of graphene oxide and/or reduced graphene oxide.

5. The lubricant composition of any one of the preceding claims, wherein the graphene nanoparticles have a size of from 2 nm up to 250 nm.

6. The lubricant composition of any one of the preceding claims, wherein the graphene nanoparticles are in the form of platelets or flakes.

7. The lubricant composition of any one of the preceding claims, wherein in the graphene nanoparticles are formed from multilayer graphene.

8. The lubricant composition of any one of the preceding claims, wherein the graphene nanoparticles consist of multilayer graphene.

9. The lubricant composition of any one of the preceding claims, wherein the lubricant composition further comprises a dispersant.

10. The lubricant composition of claim 9, wherein the dispersant is present in an amount of from 0.05 wt% up to 2 wt%.

11. The lubricant composition of claim 9 or 10, wherein the dispersant is selected from the group consisting of: polyisobutylene succinimides, (2-methoxymethylethoxy) propanol, octadecanoic acid, 12-hydroxy-polymer with alpha-hydro-omega-hydroxypoly (oxy1,2-ethanediyl, catalytic reformer fractionator, sulfonated, polymers with formaldehyde, sodium salts, Poly(oxy-1,2-ethanediyl), a-sulfo-w-[2,4,6tris(1-phenylethyl) phenoxy] -ammonium salt, Tristyrylphenol ethoxylates, polyalkylene oxide derivatives of alcohols, propane-1,2-diol, base oil, mineral oil naphtha, and combinations thereof.

12. A method for preparing a lubricant composition comprising:

dispersing graphene nanoparticles derived from a carbon containing gas in a base oil or a fully formulated lubricant;

wherein the graphene nanoparticles are present at a concentration of from 0.001 wt% up to 0.01 wt% of the total weight of the lubricant composition.

13. The method of claim 12, wherein the method comprises providing graphene nanoparticles derived from a carbon containing gas.

14. The method of any one of claims 12 to 13, wherein the step of dispersing the graphene nanoparticles comprises:

forming a mixture of graphene nanoparticles in the base oil or the fully formulated lubricant; and

subjecting the mixture to high-shear mixing.

15. The method of claim 14, wherein the high-shear mixing is carried out at a shear rate of from 40,000 to 60,000 s^{-1}.

16. The method of claim 14 or 15 wherein the step of subjecting the mixture to high-shear mixing is carried out for a time of from 5 minutes to 72 hours.

17. The method of any one of claims 12 to 16, wherein the method further comprises adding a dispersant to the mixture.

18. The method of any one of claims 12 to 17, wherein the method further comprises producing graphene nanoparticles from a carbon containing gas.

19. A lubricant composition formed according to the method of any one of claims 12 to 18.

20. Use of a lubricant composition according to any one of claims 1 to 11 as a concentrate or a finished lubricant.