CLAIMS:

1. A method for producing a lube basestock or wax from a feedstock of biological origin, the method comprising:

providing a fatty acid originated from the feedstock of biological origin and ~~an aromatic~~ a di- or tri-carboxylic acid in a solvent comprising a base; and

electrochemically coupling the fatty acid and the ~~aromatic~~ di- or tri-carboxylic acid to produce a ~~hydrocarbon~~ lube basestock or wax,

wherein the molar concentration of the fatty acid is greater than the molar concentration of the ~~aromatic~~ di- or tri-carboxylic acid.

~~2. A method for producing a lube basestock or wax from a feedstock of biological origin in a single reactor, the method comprising: hydrolyzing a triglyceride in the feedstock of biological origin to one or more fatty acids in the presence of water, wherein the amount of the water is controlled to be substantially consumed during the hydrolyzing reaction; and electrochemically coupling the fatty acids in a solvent comprising a base to produce a hydrocarbon, wherein the base is provided not to be mixed with the triglyceride in the hydrolyzing reaction.~~

~~3. A method for producing a lube basestock or wax from a feedstock of biological origin, the method comprising: providing a fatty acid and a carboxylic acid selected from the group consisting of malonic acid, succinic acid, glutaric acid, adipic acid, pimelic acid, suberic acid, sebacic acid, citric acid, isocitric acid, aconitic acid, propane-1,2,3-tricarboxylic acid, and trimesic acid; and electrochemically coupling acids to produce a hydrocarbon, wherein a molar ratio of the carboxylic acid to the fatty acid is in a range of 1:5 to 1:20.~~

~~4.~~2. The method of ~~any of the claims above~~ claim 1, further comprising hydrolyzing a triglyceride originated from the feedstock of biological origin to produce a fatty acid.

~~5.~~3. The method of ~~any of the claims above~~ claim 1, further comprising hydroisomerizing or cracking the ~~hydrocarbon to produce~~ lube basestock or wax.

~~6.~~4. The method of ~~any of the claims above~~ claim 1, wherein the feedstock of biological origin is selected from the group consisting of rapeseed oil, soy bean oil, palm oil, camelina oil, jatropha oil, jojoba oil, fish oil, lard, beef tallow, and algae oil.

~~7.~~5. The method of ~~any of the claims above~~ claim 1, wherein the fatty acid includes caprylic acid, capric acid, lauric acid, myristic acid, palmitic acid, stearic acid, arachidic acid, behenic acid, lignoceric acid, cerotic acid, myristoleic acid, palmitoleic acid, sapienic acid, oleic acid, elaidic acid, vaccenic acid, linoleic acid, linoelaidic acid, α-Linolenic acid, arachidonic acid, eicosapentaenoic acid, erucic acid, docosahexaenoic acid or a mixture thereof.

~~8.~~6. The method of ~~any of the claims above~~ claim 1, wherein the fatty acid includes lauric acid, myristic acid, palmitic acid, stearic acid, arachidic acid or a mixture thereof.

~~9.~~7. The method of ~~any of the claims above~~ claim 1, wherein the ~~aromatic~~ di- or tri-carboxylic acid includes ~~phenylacetic acid,~~ phenylenediacetic acid, ~~naphthaleneacetic acid,~~ 1,4-naphthalenedicarboxylic acid, 2,3-naphthalenedicarboxylic acid, 2,6-naphthalenedicarboxylic acid or a mixture thereof.

~~10. The method of any of the claims above, wherein the aromatic acid includes phenylacetic acid, phenylenediacetic acid, naphthaleneacetic acid or a mixture thereof.~~

~~11.~~8. The method of ~~any one of claims 1 and 4-10~~ claim 1, wherein a molar ratio of the ~~aromatic~~ di- or tri-carboxylic acid to the fatty acid is in a range of 1:5 to 1:20.

~~12.~~9. The method of claim ~~11~~ 1, wherein a molar ratio of the ~~aromatic~~ di- or tri-carboxylic acid to the fatty acid is in a range of 1:7 to 1:13.

~~13.~~10. The method of ~~any of the claims above~~ claim 1, wherein the solvent comprises methanol, hexane, acetonitrile, dimethylformamide, 4-methylmorpholine or a mixture thereof.

~~14.~~11. The method of claim ~~13~~ 1, wherein the base is sodium methoxide or amine.

~~15.~~12. The method of claim ~~13~~ 1, wherein the solvent comprising a base comprises methanol and sodium methoxide.

~~16.~~13. The method of claim ~~13~~ 1, wherein the solvent comprising a base comprises methanol and N,N-dimethylcyclohexylamine.

~~17.~~14. The method of ~~any of the claims above~~ claim 1, wherein the electrochemically coupling is carried out by applying direct current (DC).

~~18.~~15. The method of ~~any of the claims above~~ claim 14, wherein the electrochemically coupling is carried out by reversing voltage of the DC during the electrochemical coupling process.

16. A method for producing a cross-coupled lube basestock or wax from a feedstock of biological origin, the method comprising:

providing a fatty acid and a di- or tri-carboxylic acid selected from the group consisting of malonic acid, succinic acid, glutaric acid, adipic acid, pimelic acid, suberic acid, sebacic acid, citric acid, isocitric acid, aconitic acid, propane-1,2,3-tricarboxylic acid, and trimesic acid in a solvent comprising a base; and

electrochemically coupling the di- or tri-carboxylic acid with the fatty acid to produce a cross-coupled lube basestock or wax,

wherein a molar ratio of the di- or tri-carboxylic acid to the fatty acid is in a range of 1:5 to 1:20.

17. The method of claim 16, wherein the solvent comprises methanol, hexane, acetonitrile, dimethylformamide, 4-methylmorpholine or a mixture thereof.

18. The method of claim 16, wherein the base is sodium methoxide or amine.

19. The method of claim 16, wherein the solvent comprising a base comprises methanol and sodium methoxide.

20. The method of claim 16, wherein the solvent comprising a base comprises methanol and N,N-dimethylcyclohexylamine.