CLAIMS

1. A method for preparing liquid fuel products, comprising: co-processing a plurality of reactants in a catalytic cracker, said plurality of reactants comprising:

i) 93-99.95 vol.% of a petroleum fraction; and

ii) 0.05-7 vol.% of a biocrude oil derived from a cellulosic biomass, said biocrude oil having one or more component additives,

wherein at least a portion of the one or more component additives is added to a condensing chamber and/or a fast pyrolysis upflow reactor during the rapid thermal processing.

2. The method of claim 1, wherein the one or more component additives comprises a vegetable oil.

3. The method of claim 2, wherein the vegetable oil comprises 2-20 wt.% of the biocrude oil.

4. The method of claim 1, wherein the one or more component additives comprises alcohol.

5. The method of claim 4, wherein at least 75 vol.% of the alcohol additive comprises one or more primary and/or secondary alcohol with a molecular weight of less than 100 g/mole.

6. The method of claim 4, wherein the alcohol additive has a viscosity of less than 2 cP at a temperature of 27 °C.

7. The method of claim 4, wherein the alcohol additive comprises at least 2 vol.% ethanol, relative to the weight of the biocrude oil.

8. The method of claim 4, wherein:

i) the petroleum fraction comprises a vacuum gas oil;

ii) the plurality of reactants comprise 0.05-2 vol.% of the biocrude oil;

iii) the biocrude oil is the product of a mechanical and thermal conversion of a cellulosic biomass comprising grinding and non-catalytic rapid thermal processing; and

iv) the alcohol additive is at least 2 vol.% ethanol, relative to the weight of the biocrude oil.

9. The method of claim 1, wherein each gallon of biocrude oil produces at least 70 gallons of the liquid fuel products, said liquid fuel products comprising:

i) a motor gas having a boiling point up to 430 °F;
ii) a light cycle oil having a boiling point up in the range of 430-650 °F; and
iii) a distillate oil having a boiling point greater than 650 °F.

10. The method of claim 9, wherein each gallon of biocrude oil produces:

i) at least 40 gallons of the motor gas;
ii) at least 20 gallons of the light cycle oil; and
iii) at least 10 gallons of the distillate oil.

11. The method of claim 1, further comprising adding a portion of the one or more component additives to the biocrude oil, followed several days later by addition of at least a further portion of the one or more component additives to the biocrude oil prior to co-processing.

12. The method of claim 1, wherein at least a portion of the one or more component additives is added to the biocrude oil within 1 day of being formed.

13. The method of claim 1, wherein the biocrude oil is co-processed within 2 weeks following addition of at least a portion of the one or more component additives.

14. The method of claim 1, wherein the biocrude oil is a liquid product of non-catalytic rapid thermal processing.

15. The method of claim 14, wherein at least a portion of the one or more component additives is added to a condensing chamber during the rapid thermal processing.

16. The method of claim 14, wherein at least a portion of the one or more component additives is added to a fast pyrolysis upflow reactor during the rapid thermal processing.

17. The method of claim 14, wherein the non-catalytic rapid thermal processing comprises: contacting the biocrude oil product with a chelating agent.

18. The method of claim 14, wherein the non-catalytic rapid thermal processing comprises: pre-treating the cellulosic biomass with a water wash.

19. A method for preparing a fuel, comprising: co-processing a plurality of reactants in a catalytic cracker, said plurality of reactants comprising:

i) 93-99.95 vol.% of a petroleum fraction; and
ii) 0.05-7 vol.% of a biocrude oil product of a mechanical and thermal conversion of a cellulosic biomass comprising grinding and non-catalytic rapid thermal processing, said biocrude oil product having:
    a) a non-phenolic alcohol content of at least 7 vol.%; and
    b) a viscosity reducing component of at least 2 vol.% comprising one or more sub-components having a molecular weight of less than 100 g/mole.

20. The method of claim 19, wherein the cellulosic biomass has a holocellulose content of at least 65 vol.% and a lignin content of no more than 30 vol.%.

21. A method for generating at least one Cellulosic-Renewable Identification Number, comprising: co-processing a plurality of reactants in at least one approved fuel pathway comprising fluidized catalytic cracking under the Renewable Fuel Standard program, said plurality of reactants comprising:

i) 93-99.95 vol.% of a petroleum fraction; and
ii) 0.05-7 vol.% of a biocrude oil derived from a liquid product of rapid thermal processing of a cellulosic biomass, said biocrude oil having an alcohol additive.

22. The method of claim 21, wherein the at least one Cellulosic-Renewable Identification Number attaches to a gasoline or diesel fuel.

23. The method of claim 21, wherein the at least one Cellulosic-Renewable Identification Number is derived at least in part from the quantity of alcohol additive.