CLAIMS

What is claimed is:

1. A resid-containing fraction comprising a T90 distillation point of 500°C or more, a kinematic viscosity at 50°C of 20 cSt to 250 cSt, a sulfur content of 0.33 wt% or less, a BMCI of 40 or less, and a weight ratio of aliphatic sulfur to total sulfur of 0.2 or more.

2. The resid-containing fraction of claim 1, wherein the resid-containing fraction comprises a weight ratio of naphthenes to aromatics of 1.3 or more.

3. The resid-containing fraction of ~~claims 1-2~~ claim 1, wherein the resid-containing fraction comprises a weight ratio of basic nitrogen to total nitrogen of 0.2 or more; or wherein the resid-containing fraction comprises 2.0 wppm or more of sodium; or wherein the resid-containing fraction comprises 5.0 wppm or more of calcium; or a combination of two or more thereof.

4. The resid-containing fraction of ~~claims 1-3~~ claim 1, wherein the resid-containing fraction comprises a flash point of 120°C or more.

5. The resid-containing fraction of ~~claims 1-4~~ claim 1, wherein the resid-containing fraction comprises a) an n-heptane insolubles content of 0.1 wt% or less, b) a density at 15°C of 920 kg/m^3 or less, c) a naphthenes content of 30 wt% or more, d) a micro carbon residue content of 2.5 wt% or less, e) a combination of two or more of a) to d), or f) a combination of three or more of a) to d).

6. The resid-containing fraction of ~~claims 1-5~~ claim 1, wherein the resid-containing fraction comprises a molar ratio of hydrogen to carbon of 1.80 or more, or wherein the resid-containing fraction comprises an energy content of 42.0 MJ/kg or more, or wherein the resid-containing fraction comprises a T90 distillation point of 550°C or more and a kinematic viscosity at 50°C of 40 cSt to 150 cSt, or wherein the resid-containing fraction comprises a sulfur content of 0.2 wt% or less, or a combination of two or more thereof.

7. The resid-containing fraction of ~~claims 1-6~~ claim 1, wherein the resid-containing fraction comprises a kinematic viscosity at 50°C of 40 cSt to 120 cSt, or wherein the resid-containing fraction comprises a sulfur content of 0.1 wt% or less, or a combination thereof.

8. The resid-containing fraction of ~~claims 1-7~~ claim 1, wherein the resid-containing fraction comprises a T95 distillation point of 550°C or more, or wherein the resid-containing fraction comprises a final boiling point of 600°C or more, or wherein the resid-containing fraction comprises a T10 distillation point of 350°C or more, or a combination of two or more thereof.

9. The resid-containing fraction of ~~claims 1-8~~ claim 1, wherein the resid-containing fraction comprises a resid-containing fraction derived from a shale oil.

~~10. A resid-containing fraction comprising: a T10 distillation point of 150°C to 230°C, a T90 distillation point of 400°C or more, a kinematic viscosity at 50°C of 2.0 cSt to 8.0 cSt, a sulfur content of 0.33 wt% or less, a density at 15°C of 870 kg/m^3 or less, a BMCI of 35 or less, and a weight ratio of naphthenes to aromatics of 1.3 or more.~~

~~11. The resid-containing fraction of claim 10, wherein the resid-containing fraction comprises a weight ratio of basic nitrogen to total nitrogen of 0.08 or more; or wherein the resid-containing fraction comprises a weight ratio of aliphatic sulfur to total sulfur of 0.2 or more; or a combination thereof.~~

~~12. The resid-containing fraction of claims 10-11, wherein the resid-containing fraction comprises a weight ratio of naphthenes to aromatics of 2.5 or more.~~

~~13. The resid-containing fraction of claims 10-12, wherein the resid-containing fraction comprises a density at 15°C of 870 kg/m^3 or less, a micro carbon residue of 1.5 wt% or less, or a combination thereof.~~

~~14. The resid-containing fraction of claim 10-13, wherein the resid-containing fraction comprises an n-heptane insolubles content of 0.001 wt% to 0.50 wt%, or wherein the resid-containing fraction comprises a molar ratio of hydrogen to carbon of 1.85 or more, or a combination thereof.~~

~~15. The resid-containing fraction of claim 10-14, wherein the resid-containing fraction comprises 40 wt% or more of naphthenes.~~

10. The resid-containing fraction of claim 1, wherein the resid-containing fraction is used as a fuel in an engine, a furnace, a burner, a combustion device, or a combination thereof.

11. The resid-containing fraction of claim 1, wherein the resid composition comprises a carbon intensity of 94 g CO_{2eq}/MJ of lower heating value or less.

12. The resid-containing fraction of claim 1, wherein the resid-containing fraction has not been exposed to hydroprocessing conditions.

~~16.~~13. A fuel composition comprising: 5 vol% to 60 vol% of a distillate fraction and 40 vol% to 95 vol% of a resid-containing fraction, wherein the resid-containing fraction comprises a T90 distillation point of 550°C or more, a kinematic viscosity at 50°C of 40 cSt to 150 cSt, a sulfur content of 0.2 wt% or less, a BMCI of 40 or less, and a weight ratio of aliphatic sulfur to total sulfur of 0.2 or more.

~~17.~~14. The fuel composition of claim ~~16~~ 13, wherein the distillate fraction comprises a renewable distillate fraction.

~~18.~~15. The fuel composition of ~~claims 16-17~~ claim 14, wherein the renewable distillate fraction comprises one or more of biodiesel, fatty acid alkyl ester, and hydrotreated vegetable oil; or

wherein the renewable distillate comprises a distillate made, processed or a combination thereof using a renewable energy source; or wherein the renewable distillate comprises a distillate formed from processing of biologically derived waste, or a combination thereof.

~~19.~~16. The fuel composition of ~~claims 16-18~~ claim 13, wherein the fuel composition comprises a pour point of 30°C or less.

17. The fuel composition of claim 13, wherein the fuel composition is used as a fuel in an engine, a furnace, a burner, a combustion device, or a combination thereof.

18. A fuel composition, comprising:

a) 50 vol% to 99 vol% of a distillate fraction and 1.0 vol% to 50 vol% of a resid-containing fraction, wherein the fuel composition comprises a micro carbon residue content of 0.30 wt% or less, a kinematic viscosity at 40°C of 11 cSt or less, and a sulfur content of 0.5 wt% or less; or

b) 45 vol% to 99 vol% of the distillate fraction and 1.0 vol% to 55 vol% of the resid-containing fraction, wherein the fuel composition comprises a micro carbon residue content of 2.5 wt % or less, a kinematic viscosity at 50°C of 10 cSt or less, and a sulfur content of 0.5 wt% or less,

wherein the resid-containing fraction of a) and b) comprises a T90 distillation point of 550°C or more, a kinematic viscosity at 50°C of 40 cSt to 150 cSt, a sulfur content of 0.2 wt% or less, a BMCI of 40 or less, and a weight ratio of aliphatic sulfur to total sulfur of 0.2 or more.

19. The fuel composition of claim 18, wherein the fuel composition is used as a fuel in an engine, a furnace, a burner, a combustion device, or a combination thereof.

20. A method for forming a resid-containing fraction, comprising:

fractionating a whole crude or crude fraction to form a resid-containing fraction comprising a T90 distillation point of 500°C or more, a kinematic viscosity at 50°C of 20 cSt to 250 cSt, a sulfur content of 0.33 wt% or less, a BMCI of 40 or less, and a weight ratio of aliphatic sulfur to total sulfur of 0.2 or more.

21. The method of claim 20, wherein the resid-containing fraction is formed without exposing the resid-containing fraction to hydroprocessing conditions.

22. The method of ~~claims 20-21~~ claim 20, wherein the resid-containing fraction comprises a weight ratio of naphthenes to aromatics of 1.3 or more.

23. The method of ~~claims 20-22~~ claim 20, wherein the resid-containing fraction comprises a weight ratio of basic nitrogen to total nitrogen of 0.2 or more; or wherein the resid-containing fraction comprises 2.0 wppm or more of sodium; or wherein the resid-containing fraction comprises 5 wppm or more of calcium; or a combination of two or more thereof.

24. The method of ~~claims 20-24~~ claim 20, wherein the resid-containing fraction comprises a flash point of 120°C or more.

25. A resid-containing fraction comprising: a T10 distillation point of 150°C to 230°C, a T90 distillation point of 400°C or more, a kinematic viscosity at 50°C of 2.0 cSt to 8.0 cSt, a sulfur content of 0.33 wt% or less, a density at 15°C of 870 kg/m^3 or less, a BMCI of 35 or less, and a weight ratio of naphthenes to aromatics of 1.3 or more.

26. The resid-containing fraction of claim 25, wherein the resid-containing fraction comprises a weight ratio of basic nitrogen to total nitrogen of 0.08 or more; or wherein the resid-containing fraction comprises a weight ratio of aliphatic sulfur to total sulfur of 0.2 or more; or a combination thereof.

27. The resid-containing fraction of claim 25, wherein the resid-containing fraction comprises a weight ratio of naphthenes to aromatics of 2.5 or more.

28. The resid-containing fraction of claim 25, wherein the resid-containing fraction comprises a density at 15°C of 870 kg/m^3 or less, a micro carbon residue of 1.5 wt% or less, or a combination thereof.

29. The resid-containing fraction of claim 25, wherein the resid-containing fraction comprises an n-heptane insolubles content of 0.001 wt% to 0.50 wt%, or wherein the resid-containing fraction comprises a molar ratio of hydrogen to carbon of 1.85 or more, or a combination thereof.

30. The resid-containing fraction of claim 25, wherein the resid-containing fraction comprises 40 wt% or more of naphthenes.

31. The resid-containing fraction of claim 25, wherein the resid-containing fraction is used as a fuel in an engine, a furnace, a burner, a combustion device, or a combination thereof.

~~25.~~32. A method for forming a resid-containing fraction, comprising:

fractionating a whole crude or crude fraction to form a resid-containing fraction comprising a T10 distillation point of 150°C to 230°C, a T90 distillation point of 440°C or more, a kinematic viscosity at 50°C of 2.0 cSt to 8.0 cSt, a flash point of 60°C or more, a sulfur content of 0.33 wt% or less, a density at 15°C of 870 kg/m^3 or less, a naphthenes content of 30 wt% or more, a weight ratio of naphthenes to aromatics of 1.35 or more, and a micro carbon residue content of 1.5 wt% or less.