

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, 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, wherein the resid-containing fraction comprises a flash point of 120°C or more.
5. The resid-containing fraction of claims 1-4, 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/m³ 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, 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, 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, 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, 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/m³ 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/m³ 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.
16. 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. The fuel composition of claim 16, wherein the distillate fraction comprises a renewable distillate fraction.
18. The fuel composition of claims 16-17, 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. The fuel composition of claims 16-18, wherein the fuel composition comprises a pour point of 30°C or less.
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, 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, 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, wherein the resid-containing fraction comprises a flash point of 120°C or more.

25. 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/m³ 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.