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CLAIMS:

1. A method for producing a naphtha product and an unconverted product, comprising:

exposing a first feedstock to a first hydrocracking catalyst in a first reaction vessel under first hydrocracking conditions to form a first hydrocracked effluent including at least a first liquid phase portion, at least about 60 wt% of the first feedstock boiling above about 400°F (about 204°C) and at least about 60 wt% of the first feedstock boiling below about 650°F (about 343°C), the first hydrocracking catalyst comprising Ni, Mo, and W on an acidic support, the ratio of Mo to W being from about 2:1 to about 1:2;

fractionating the first liquid phase portion and at least a portion of a second liquid phase portion to form a first naphtha fraction and a first unconverted fraction, the first naphtha fraction corresponding to at least about 80 wt% of the first feedstock and having a final boiling point of about 400°F (about 204°C) or less;

withdrawing a portion of the first unconverted fraction as a first unconverted product, a weight of the withdrawn first unconverted product corresponding to from about 5 wt% to about 15 wt% of the first feedstock, the withdrawn first unconverted product having an initial boiling point of at least about 400°F (about 204°C);

separating at least a portion of the remaining portion of the first unconverted fraction as a second feedstock;

exposing the second feedstock to a second hydrocracking catalyst in a second reactor vessel under second hydrocracking conditions to form a second hydrocracked effluent including at least the second liquid phase portion; and

separating the second hydrocracked effluent to produce the second liquid phase portion;

wherein the temperature of the second hydrocracking conditions is at least about 20°F (11°C) less than the temperature of the first hydrocracking conditions, and wherein the temperature of the first hydrocracking conditions at start-of-run is less than about 710°F (377°C).

2. A method for producing a naphtha product and an unconverted product, comprising:

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exposing a first feedstock to a first catalyst in a first reaction vessel under hydrotreating conditions to form a first reactor effluent;

exposing at least a portion of the first reactor effluent to a first hydrocracking catalyst in a second reaction vessel under first hydrocracking conditions to form a first hydrocracked effluent;

including at least a first liquid phase portion, at least about 60 wt% of the first feedstock boiling above about 400°F (about 204°C) and at least about 60 wt% of the first feedstock boiling below about 650°F (about 343°C), and the first hydrocracking catalyst comprising Ni, Mo, and W on an acidic support, the ratio of Mo to W being from about 2:1 to about 1:2;

fractionating the first liquid phase portion and at least a portion of a second liquid phase portion to form a first naphtha fraction and a first unconverted fraction, the first naphtha fraction corresponding to at least about 80 wt% of the first feedstock and having a final boiling point of about 400°F (about 204°C) or less;

withdrawing a portion of the first unconverted fraction as a first unconverted product, a weight of the withdrawn first unconverted product corresponding to from about 5 wt% to about 15 wt% of the first feedstock, the withdrawn first unconverted product having an initial boiling point of at least about 400°F (about 204°C);

separating at least a portion of the remaining portion of the first unconverted fraction as a second feedstock;

exposing the second feedstock to a second hydrocracking catalyst in a third reaction vessel under second hydrocracking conditions to form a second hydrocracked effluent including at least the second liquid phase portion; and

separating the second hydrocracked effluent to produce the second liquid phase portion;

wherein the temperature of the second hydrocracking conditions is at least about 20°F (11°C) less than the temperature of the first hydrocracking conditions, and wherein the temperature of the first hydrocracking conditions at start-of-run is less than about 710°F (377°C).

3. The method of claim 1, wherein the first reaction vessel further contains a hydrotreating catalyst.

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4. The method of claim 2, wherein the first catalyst is a hydrotreating catalyst.
5. The method of claim 2, wherein the first catalyst is a hydrocracking catalyst.
6. The method of claim 4, wherein the first reaction vessel also contains a hydrocracking catalyst.
7. The method of any preceding claim, wherein the second hydrocracked effluent is separated into at least a second naphtha fraction and a second unconverted fraction, and at least a portion of the second unconverted fraction is used as the second liquid phase portion.
8. The method of claim 7, wherein the second naphtha fraction corresponds to from about 50 wt% to about 80 wt% of the second feedstock and has a final boiling point of about 400°F (204°C).
9. The method of any preceding claim, wherein at least about 80 wt% of at least one of the first feedstock and the second feedstock boils below about 700°F (371°C).
10. The method of any preceding claim, wherein a weight of the first unconverted product corresponds to less than about 25 wt% of the first feedstock.
11. The method of any preceding claim, wherein at least a portion of the second liquid phase portion is separated as a second unconverted product.
12. The method of claim 11, wherein a weight of the second unconverted product corresponds to from about 20 wt% to about 50 wt% of the second feedstock.
13. The method of any preceding claim, wherein at least one of the first unconverted product and the second unconverted product has a T10 boiling point of at least about 425°F (218°C).

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14. The method of any preceding claim, wherein the T90 boiling point of at least one of the first unconverted product and the second unconverted product is about 700°F (371°C) or less.
15. The method of any preceding claim, wherein about 25 wt% or less of at least one of the first unconverted product and the second unconverted product boils above about 600°F (316°C).
16. The method of any of claims 1 and 3-15, wherein the first reaction vessel further contains a dewaxing catalyst.
17. The method of any of claims 2-15, wherein the second reaction vessel further contains a dewaxing catalyst.
18. The method of any of claims 16-17, wherein the dewaxing catalyst comprises ZSM-48, ZSM-23, zeolite Beta, or a combination thereof.
19. The method of any preceding claim, wherein the first feedstock is comprised of a light cycle oil with a T10 boiling point of at least 300°F (149°C) and a T90 boiling point less than or equal to 650°F (343°C).
20. The method of any preceding claim, wherein the first feedstock consists essentially of a light cycle oil.

CLAIMS:

1. A method for producing a naphtha product and an unconverted product, comprising:

exposing a first feedstock to a first hydrocracking catalyst in a first reaction vessel under first hydrocracking conditions to form a first hydrocracked effluent including at least a first liquid phase portion, at least about 60 wt% of the first feedstock boiling above about 400°F (about 204°C) and at least about 60 wt% of the first feedstock boiling below about 650°F (about 343°C), the first hydrocracking catalyst comprising Ni, Mo, and W on an acidic support, the ratio of Mo to W being from about 2:1 to about 1:2, the first reaction vessel further containing a dewaxing catalyst;

fractionating the first liquid phase portion and at least a portion of a second liquid phase portion to form a first naphtha fraction and a first unconverted fraction, the first naphtha fraction corresponding to at least about 80 wt% of the first feedstock and having a final boiling point of about 400°F (about 204°C) or less;

withdrawing a portion of the first unconverted fraction as a first unconverted product, a weight of the withdrawn first unconverted product corresponding to from about 5 wt% to about 15 wt% of the first feedstock, the withdrawn first unconverted product having an initial boiling point of at least about 400°F (about 204°C);

separating at least a portion of the remaining portion of the first unconverted fraction as a second feedstock;

exposing the second feedstock to a second hydrocracking catalyst in a second reactor vessel under second hydrocracking conditions to form a second hydrocracked effluent including at least the second liquid phase portion; and

separating the second hydrocracked effluent to produce the second liquid phase portion;

wherein the temperature of the second hydrocracking conditions is at least about 20°F (11°C) less than the temperature of the first hydrocracking conditions, and wherein the temperature of the first hydrocracking conditions at start-of-run is less than about 710°F (377°C).

2. The method of claim 1, wherein the second hydrocracked effluent is separated into at least a second naphtha fraction and a second unconverted fraction, and at least a portion of the second unconverted fraction is used as the second liquid phase portion.
3. The method of claim 2, wherein the second naphtha fraction corresponds to from about 50 wt% to about 80 wt% of the second feedstock and has a final boiling point of about 400°F (204°C).
4. The method of claim 1, wherein at least about 80 wt% of at least one of the first feedstock and the second feedstock boils below about 700°F (371°C).
5. The method of claim 1, wherein a weight of the first unconverted product corresponds to less than about 25 wt% of the first feedstock.
6. The method of claim 1, wherein at least a portion of the second liquid phase portion is separated as a second unconverted product.
7. The method of claim 6, wherein a weight of the second unconverted product corresponds to from about 20 wt% to about 50 wt% of the second feedstock.
8. The method of claim 6, wherein at least one of the first unconverted product and the second unconverted product has a T10 boiling point of at least about 425°F (218°C).
9. The method of claim 8, wherein the T90 boiling point of at least one of the first unconverted product and the second unconverted product is about 700°F (371°C) or less.
10. The method of claim 9, wherein about 25 wt% or less of at least one of the first unconverted product and the second unconverted product boils above about 600°F (316°C).
11. The method of claim 1, wherein the dewaxing catalyst comprises ZSM-48, ZSM-23, zeolite Beta, or a combination thereof.
12. The method of claim 1, wherein the first feedstock is comprised of a light cycle oil with a T10 boiling point of at least 300°F (149°C) and a T90 boiling point less than or equal to 650°F (343°C).
13. The method of claim 12, wherein the first feedstock consists essentially of a light cycle oil.

14. The method of claim 1, wherein the first reaction vessel further contains a hydrotreating catalyst.

15. A method for producing a naphtha product and an unconverted product, comprising:

exposing a first feedstock to a first catalyst in a first reaction vessel under hydrotreating conditions to form a first reactor effluent;

exposing at least a portion of the first reactor effluent to a first hydrocracking catalyst in a second reaction vessel under first hydrocracking conditions to form a first hydrocracked effluent;

including at least a first liquid phase portion, at least about 60 wt% of the first feedstock boiling above about 400°F (about 204°C) and at least about 60 wt% of the first feedstock boiling below about 650°F (about 343°C), and the first hydrocracking catalyst comprising Ni, Mo, and W on an acidic support, the ratio of Mo to W being from about 2:1 to about 1:2;

fractionating the first liquid phase portion and at least a portion of a second liquid phase portion to form a first naphtha fraction and a first unconverted fraction, the first naphtha fraction corresponding to at least about 80 wt% of the first feedstock and having a final boiling point of about 400°F (about 204°C) or less;

withdrawing a portion of the first unconverted fraction as a first unconverted product, a weight of the withdrawn first unconverted product corresponding to from about 5 wt% to about 15 wt% of the first feedstock, the withdrawn first unconverted product having an initial boiling point of at least about 400°F (about 204°C);

separating at least a portion of the remaining portion of the first unconverted fraction as a second feedstock;

exposing the second feedstock to a second hydrocracking catalyst in a third reaction vessel under second hydrocracking conditions to form a second hydrocracked effluent including at least the second liquid phase portion; and

separating the second hydrocracked effluent to produce the second liquid phase portion;

wherein the temperature of the second hydrocracking conditions is at least about 20°F (11°C) less than the temperature of the first hydrocracking conditions, and wherein

the temperature of the first hydrocracking conditions at start-of-run is less than about 710°F (377°C).

16. The method of claim 1, wherein the first catalyst is a hydrotreating catalyst.

17. The method of claim 16, wherein the first reaction vessel also contains a hydrocracking catalyst.

18. The method of claim 15, wherein the second hydrocracked effluent is separated into at least a second naphtha fraction and a second unconverted fraction, and at least a portion of the second unconverted fraction is used as the second liquid phase portion.

19. The method of claim 18, wherein the second naphtha fraction corresponds to from about 50 wt% to about 80 wt% of the second feedstock and has a final boiling point of about 400°F (204°C).

20. The method of claim 15, wherein at least about 80 wt% of at least one of the first feedstock and the second feedstock boils below about 700°F (371°C).

21. The method of claim 15, wherein a weight of the first unconverted product corresponds to less than about 25 wt% of the first feedstock.

22. The method of claim 15, wherein at least a portion of the second liquid phase portion is separated as a second unconverted product.

23. The method of claim 22, wherein a weight of the second unconverted product corresponds to from about 20 wt% to about 50 wt% of the second feedstock.

24. The method of claim 22, wherein at least one of the first unconverted product and the second unconverted product has a T10 boiling point of at least about 425°F (218°C) and a T90 boiling point of about 700°F (371°C) or less.

25. The method of claim 24, wherein about 25 wt% or less of at least one of the first unconverted product and the second unconverted product boils above about 600°F (316°C).

26. The method of claim 1, wherein the second reaction vessel further contains a dewaxing catalyst comprising ZSM-48, ZSM-23, zeolite Beta, or a combination thereof.

27. The method of claim 15, wherein the first feedstock is comprised of a light cycle oil with a T10 boiling point of at least 300°F (149°C) and a T90 boiling point less than or equal to 650°F (343°C).

28. The method of claim 27, wherein the first feedstock consists essentially of a light cycle oil.