CLAIMS:

What is claimed is:

1. A process for converting hydrocarbons by pyrolysis, comprising:

introducing a plastic material and a carrier liquid comprising a hydrocarbon into a vis-breaker;

cracking at least a portion of the plastic material in the vis-breaker under vis-breaking conditions to produce an effluent comprising a pyrolysis oil;

heating at least a portion of the effluent within a convection section of a steam cracking furnace and combining the at least a portion of the effluent with an aqueous fluid to produce a heated mixture comprising hydrocarbons and steam, wherein the heating is carried out before, during, and/or after the at least a portion of the effluent is combined with the aqueous fluid; and

steam cracking at least a portion of the heated mixture within a radiant section of the steam cracking furnace to produce a steam cracker effluent comprising one or more olefins.

2. The process of claim 1, further comprising separating a first fraction comprising H_2, one or more C_1-C_4 hydrocarbons, or a mixture thereof, a second fraction comprising one or more C_5-C_{20} hydrocarbons, and, if present, a third fraction comprising one or more C_{21+} hydrocarbons from the effluent, wherein the second fraction is heated within the convection section of the steam cracking furnace and combined with the aqueous fluid to produce the heated mixture.

3. The process of claim 2, wherein the third fraction is separated from the effluent, the process further comprising recycling at least a portion of the third fraction to the vis-breaker.

4. The process of claim 2 or claim 3, wherein the plastic material comprises a contaminant-containing polymer and/or a compound comprising a contaminant disposed thereon, and wherein the second fraction is in a vapor phase and further comprises one or more contaminant-containing compounds, the process further comprising:

contacting the second fraction with a guard bed to remove at least a portion of the one or more contaminant-containing compounds to produce a contaminant-lean second fraction, wherein the contaminant-lean second fraction is heated within the convection section of the steam cracking furnace and combined with the aqueous fluid to produce the heated mixture.

5. The process of claim 4, wherein the plastic material comprises the contaminant-containing polymer, and wherein the contaminant-containing polymer comprises polyvinyl chloride, polyvinylidene chloride, chlorinated polyvinyl chloride, or a mixture thereof.

6. The process of claim 4 or claim 5, wherein the compound comprising the contaminant is disposed on the plastic material, and wherein the compound comprising the contaminant comprises calcium hypochlorite, sodium hypochlorite, sodium chloride, calcium chloride, magnesium chloride, iron chloride, or a mixture thereof.

7. The process of any one of claims 1 to 6, further comprising separating a vapor phase fraction and a liquid phase fraction from the heated mixture, wherein the vapor phase fraction is steam cracked within the radiant section of the steam cracking furnace to produce the steam cracker effluent.

8. The process of claim 7, further comprising recycling at least a portion of the liquid phase fraction to the vis-breaker.

9. The process of any one of claims 1 to 8, wherein the plastic material and the carrier liquid are separately introduced into the vis-breaker.

10. The process of any one of claims 1 to 9, wherein the plastic material and the carrier liquid are introduced as a mixture into the vis-breaker.

11. The process of claim 10, wherein at least a portion of the plastic material is solubilized in the mixture.

12. The process of claim 10, wherein the plastic material is slurried in the carrier liquid.

13. The process of any one of claims 1 to 12, wherein the vis-breaking conditions comprise a temperature of from 350°C to 550°C and an equivalent residence time of from 5 minutes to 30 minutes.

14. The process of any one of claims 1 to 13, wherein the carrier liquid comprises a heat-soaked and/or hydrotreated hydrocarbon stream having an initial boiling point of at least 300°C, as measured according to ASTM D2887-19aee.

15. The process of any one of claims 1 to 14, wherein the plastic material comprises a

nitrogen-containing polymer, a chlorine-containing polymer, an oxygen-containing polymer, a polyethylene polymer, a polypropylene polymer, a polystyrene polymer, a butadiene polymer, an isoprene polymer, an isobutylene polymer, or any mixture thereof.

16. The process of any one of claims 1 to 15, wherein the amount of plastic material introduced into the vis-breaker is in a range from 0.1 wt% to 25 wt%, based on the combined weight of the plastic material and the carrier liquid introduced into the vis-breaker.

17. A process for converting hydrocarbons by pyrolysis, comprising:

heating a mixture comprising a plastic material and a carrier liquid within a convection section of a steam cracking furnace and combining the mixture with an aqueous fluid to produce a heated mixture, wherein:

the heating is carried out before, during, and/or after the mixture is combined with the aqueous fluid,

the carrier liquid comprises a hydrocarbon, and

at least a portion of the plastic material is cracked to produce a pyrolysis oil; and

steam cracking at least a portion of the heated mixture within a radiant section of the steam cracking furnace to produce a steam cracker effluent comprising one or more olefins.

18. The process of claim 17, further comprising separating a vapor phase fraction and a liquid phase fraction from the heated mixture, wherein the vapor phase fraction is steam cracked within the radiant section of the steam cracking furnace to produce the steam cracker effluent.

19. The process of claim 18, further comprising recycling at least a portion of the liquid phase fraction to the convection section of the steam cracking furnace.

20. The process of claim 18 or claim 19, wherein the plastic material comprises a contaminant-containing polymer and/or a compound comprising a contaminant disposed thereon, and wherein the vapor phase fraction comprises one or more contaminant-containing compounds, the process further comprising:

contacting the vapor phase fraction with a guard bed to remove at least a portion of the one or more contaminant-containing compounds to produce a contaminant-lean vapor phase fraction, wherein the contaminant-lean vapor phase fraction is steam cracked within the radiant

section of the steam cracking furnace to produce the steam cracker effluent.

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