CLAIMS

1. A method of pretreating a hydrocarbon steam cracker feed, the hydrocarbon steam cracker feed comprising pyrolysis oil from plastic waste and at least one contaminant, the contaminant comprising nitrogen, oxygen, or compounds thereof, the hydrocarbon steam cracker feed further comprising paraffinic hydrocarbons and olefins, the method comprising contacting the feed with a solvent to produce a pretreated feed having a reduced content of fouling components , a reduced content of the at least one contaminant, and a rich solvent having an increased content of the fouling components and the at least one contaminant;
wherein the fouling components comprise polycyclic aromatics, resins, or a mixture thereof and cause fouling in preheat, convection and radiant sections of a steam cracker;wherein the solvent is selected from the group consisting of furfural, sulfolane, toluene, N-formyl morpholine, N-methylpyrrolidone, tetra-ethylene glycol, and dimethylsulfoxide.

2. The method of claim 1 wherein the pretreated feed has a higher hydrogen content than the hydrocarbon steam cracker feed.

3. The method of claim 1 wherein the fouling components cause fouling by condensing in transfer line exchangers.

4. The method of claim 1 further comprising removing the fouling components from the rich solvent and using those components in another part of a steam cracker system as a quench oil stream or to reduce the viscosity of a heavy pitch and/or cracked gasoil stream.

5. A process for steam cracking hydrocarbons comprising:

   a. Feeding a hydrocarbon steam cracker feed comprising pyrolysis oil from plastic waste and at least one contaminant, the contaminant comprising nitrogen, oxygen, or compounds thereof, the hydrocarbon steam cracker feed further comprising paraffinic hydrocarbons and olefins, to the process;
   b. Pretreating the feed by contacting the feed with a solvent to produce a pretreated feed having a reduced content of the contaminants comprising nitrogen, oxygen, or compounds thereof and a reduced content of fouling components that cause fouling in preheat, convection and radiant sections of

a steam cracker and a rich solvent having an increased content of fouling components and the at least one contaminant;

c. Heating the pretreated feed; and

d. Passing the pretreated feed through the steam cracker under cracking conditions to produce cracked products;

wherein the fouling components comprise polycyclic aromatics, resins, or a mixture thereof; and

wherein the solvent is selected from the group consisting of furfural, sulfolane, toluene, N-formyl morpholine, N-methylpyrrolidone, tetra-ethylene glycol, and dimethylsulfoxide.

6. The process of claim 5 further comprising passing the cracked products through one or more heat exchangers to reduce a temperature of the cracked products.

7. The process of claim 5 wherein the cracking conditions comprise a temperature in a range of from 700 to 900 °C.

8. The method of claim 1 wherein the quantity of non-paraffinic hydrocarbons is less than 10 wt% based on the total weight of hydrocarbons.

9. The process of claim 5 wherein the quantity of non-paraffinic hydrocarbons is less than 10 wt% based on the total weight of hydrocarbons.