

Claims

1. A method for producing biohydrocarbons, the method comprising:
 - a preparation step of preparing a hydrocarbon raw material from a bio-renewable feedstock,
 - an isomerization step of subjecting at least straight chain hydrocarbons in the hydrocarbon raw material to an isomerization treatment to prepare an isomeric raw material containing at least 50 wt.-% iso-paraffins, wherein the isomeric raw material comprises more than 50 wt.-% of C₁₀-C₂₀ hydrocarbons, the content of even-numbered hydrocarbons in the C₁₀-C₂₀ range being more than 50 wt.-%, and where the isomeric raw material comprises 1.0 wt.-% or less aromatics, and less than 2.0 wt.-% of olefins, and
 - a cracking step of thermally cracking the isomeric raw material to produce biohydrocarbons,wherein the biohydrocarbons comprise at least 7 wt. % aromatics selected from the group consisting of benzene, toluene and xylenes.
2. The method according to claim 1, wherein the isomeric raw material contains at least 60 wt.-%, preferably at least 65 wt.-%, preferably at least 70 wt.-%, more preferably at least 75 wt.-%, at least 80 wt.-%, at least 85 wt.-%, or at least 90 wt.-% iso-paraffins.
3. The method according to claim 1 or 2, wherein the thermal cracking in the cracking step is conducted at a temperature (coil outlet temperature COT) of at least 790°C, preferably at least 800°C, preferably at least 820°C, at least 830°C, or at least 840°C; and/or
 - wherein the thermal cracking in the cracking step is conducted at a temperature of at most 960°C, preferably at most 920°C, more preferably at most 890°C, further preferably at most 870°C.
4. The method according to any one of the preceding claims, wherein the preparation step comprises a step of deoxygenating the bio-renewable feedstock; and/or

wherein the step of deoxygenating the bio-renewable feedstock preferably is a hydrotreatment step, preferably a hydrodeoxygenation step.

5. The method according to any one of the preceding claims, wherein the preparation step comprises a step of hydrocracking hydrocarbons in the hydrocarbon raw material.

6. The method according to any one of the preceding claims, wherein the isomeric raw material comprises at least one of a diesel range fraction and a naphtha range fraction and at least the diesel range fraction and/or the naphtha range fraction is subjected to thermal cracking.

7. The method according to any one of the preceding claims, wherein the thermal cracking in the cracking step comprises steam cracking, and

wherein the steam cracking is preferably performed at a flow rate ratio between water and the isomeric raw material (H_2O flow rate [kg/h] / iso-HC flow rate [kg/h]) of 0.05 to 1.20, and

wherein the flow rate ratio between water and the isomeric raw material is preferably at least 0.10, further preferably at least 0.20, more preferably at least 0.25, even more preferably at least 0.30, and

wherein the flow rate ratio between water and the isomeric raw material is preferably at most 1.00, further preferably at most 0.80, more preferably at most 0.60, even more preferably at most 0.50.

8. The method according to any one of the preceding claims, wherein the biohydrocarbons comprise at least 8 wt.-% aromatics selected from the group consisting of benzene, toluene and xylenes.

9. A method for producing biohydrocarbons, the method comprising:

a step of providing an isomeric raw material obtained from a bio-renewable feedstock and containing at least 50 wt.-%, preferably at least 65 wt.-%, more preferably at least 70 wt.-% iso-paraffins, wherein the isomeric raw material comprises more than 50 wt.-% of C_{10} - C_{20} hydrocarbons, the content of even-numbered hydrocarbons in the C_{10} - C_{20}

range being more than 50 wt.-%, and where the isomeric raw material comprises 1.0 wt.-% or less aromatics, and less than 2.0 wt.-% of olefins, and

a cracking step of thermally cracking the isomeric raw material to produce biohydrocarbons,
wherein the biohydrocarbons comprise at least 7 wt. % aromatics selected from the group consisting of benzene, toluene and xylenes.

10. The method according to claim 9, wherein the step of providing the isomeric raw material comprises a preparation step of preparing a hydrocarbon raw material from the bio-renewable feedstock and optionally an isomerization step of subjecting at least the straight chain alkanes in the hydrocarbon raw material to an isomerization treatment to prepare the isomeric raw material

11. A method of producing a polymer, comprising producing biohydrocarbons according to the method of any one of claims 1 to 10, optionally purifying and/or chemically modifying at least a part of the biohydrocarbons to provide biomonomers, and polymerizing the biomonomers to obtain a polymer.

12. The method according to claim 11, wherein the polymer is a polyethylene terephthalate (PET), a polyolefin, ABS or a derivative thereof, and/or

wherein the method employs at least 50 wt.-%, preferably at least 80 wt.-%, more preferably at least 90 wt.-%, more preferably at least 95 wt.-%, more preferably more than 99 wt.-%, even more preferably 100 wt.-% of monomers derived from bio-renewable raw materials, relative to all monomers constituting the polymer.

13. The method according to claims 11 or 12, wherein the method further comprises forming an article, such as a film, beads, or a molded article from the polymer.

14. A mixture of biohydrocarbons comprising at least 7 wt.-% aromatics selected from the group consisting of benzene, toluene and xylenes, the mixture being obtainable by the method according to any one of claims 1 to 10.