

Claims:

1. A method for producing a hydrocarbon mixture having an end-boiling point according to ASTM D86 below 300°C and being suitable for use as an aviation fuel from a decarboxylation feedstock comprising fatty acid esters and/or triglycerides and wherein at least 40% of the carbon atoms of the decarboxylation feedstock are contained in C18 side-chains, by converting said decarboxylation feedstock in the presence of a material catalytically selective towards decarboxylation, such that the ratio between deoxygenation by formation of carbon oxides and deoxygenation by formation of water is at least 1.5:1, 2:1 or 3:1, as measured by the ratio of C17 paraffins to C18 paraffins in the deoxygenated hydrocarbon mixture.
2. A method according to claim 1 where decarboxylation conditions involve a temperature in the interval 250-400°C, a pressure in the interval 30-150 bar, and a liquid hourly space velocity (LHSV) in the interval 0.1-2 and wherein the material catalytically active in decarboxylation comprises nickel optionally in combination with other metals, supported on a carrier comprising one or more refractory oxides, such as alumina, silica or titania.
3. A method according to claim 1 or 2, wherein at least 60% or 80% of the carbon atoms of said decarboxylation feedstock is contained in C18 side chains.
4. A method according to claim 1, 2 or 3 wherein the material catalytically active in decarboxylation comprises more than 5 wt% Ni, more than 10 wt% Ni or more than 15 wt% Ni and less than 30 wt% Ni, less than 50 wt% Ni or less than 70 wt% Ni and less than 1 wt%, less than 0.5 wt% or less than 0.1 wt% Co, Mo and W, such as 0 wt% Co, Mo and W.
5. A method according to claim 1, 2, 3 or 4, wherein said decarboxylation feedstock is a saturated decarboxylation feedstock, comprising less than 10 wt% or 1 wt% olefinic oxygenates.
6. A method according to claim 5, wherein said saturated decarboxylation feedstock is provided as the product of a hydrogenation reaction, receiving a raw oxygenate

feedstock comprising at least 10 wt% or 50 wt% olefinic oxygenates and selectively hydrogenating olefinic oxygenates under olefin pre-hydrogenation conditions, to provide said saturated decarboxylation feedstock.

- 5 7. A method according to claim 6 where pre-hydrogenation conditions involve a temperature in the interval from 150 °C to 220°C, 250°C or 280°C, a pressure in the interval 30-150 bar, and a liquid hourly space velocity (LHSV) in the interval 0.1-2 and wherein the material catalytically active in pre-hydrogenation comprises 5 wt% to 20 wt% molybdenum or tungsten, in combination with 1 wt% to 5 wt% nickel
10 and/or cobalt, supported on a carrier comprising one or more refractory oxides, such as alumina, silica or titania.
8. A method according to claim 1, 2, 3, 4, 5, 6 or 7 comprising separating the deoxygenated hydrocarbon mixture according to boiling point, to provide a hydrocracked
15 intermediate aviation fuel having T10 below 205°C and final boiling point below 300°C according to ASTM D86.
9. A method according to claim 1, 2, 3, 4, 5, 6, 7 or 8 wherein the total volume of hydrogen sulfide relative to the volume of molecular hydrogen in the gas phase of the
20 total stream directed to contact the material catalytically active in decarboxylation is at least 50 ppm_v, 100 ppm_v or 200 ppm_v, optionally originating from an added stream comprising one or more sulfur compounds, such as dimethyl disulfide or fossil fuels.
- 25 10. A method according to claim 1, 2, 3, 4, 5, 6, 7, 8 or 9 wherein said decarboxylation feedstock comprises at least 50%wt triglycerides or fatty acids.
11. A method according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 further comprising a hydrocracking step, under active hydrocracking conditions, where the deoxygenated
30 hydrocarbon mixture or a mixture derived therefrom is directed to contact a material catalytically active in hydrocracking.

12. A method according to claim 11, wherein hydrocracking conditions involve a temperature in the interval 300-450°C, a pressure in the interval 30-150 bar, and a liquid hourly space velocity (LHSV) in the interval 0.5-8 and wherein the material catalytically active in hydrocracking comprises an active metal taken from the group comprising platinum, palladium, nickel, cobalt, tungsten and molybdenum, preferably one or more elemental noble metals such as platinum or palladium, an acidic support being one or more of an amorphous acidic oxides such as silica-alumina and a molecular sieve showing high cracking activity, such as molecular sieves having a topology taken from the group of MFI, BEA and FAU and an amorphous refractory support comprising one or more oxides taken from the group comprising alumina, silica and titania.
13. A method according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12 further comprising an isomerization step, under active isomerization conditions involves a temperature in the interval 250-350°C, a pressure in the interval 30-150 bar, and a liquid hourly space velocity (LHSV) in the interval 0.5-8 and wherein the material catalytically active in isomerization comprises an active metal taken from the group comprising platinum, palladium, nickel, cobalt, tungsten and molybdenum, preferably one or more elemental noble metals such as platinum or palladium, a molecular sieve showing high isomerization selectivity, such as molecular sieves having a topology taken from the group of MOR, FER, MRE, MWW, AEL, TON and MTT and an amorphous refractory support comprising one or more oxides taken from the group comprising alumina, silica and titania.
14. A process plant for production of a hydrocarbon fraction from an decarboxylation feedstock, said process plant comprising a decarboxylation section, a hydrocracking section and a fractionation section, said process plant being configured for directing the decarboxylation feedstock in combination with an amount of a hydrocracked intermediate product to the decarboxylation section to provide a deoxygenated hydrocarbon mixture, separating the deoxygenated hydrocarbon mixture in said fractionation section to provide at least two fractions, including a low boiling product fraction and a high boiling product fraction, directing at least an amount of

the high boiling product fraction to the hydrocracking section to provide a hydrocracked intermediate product, directing at least an amount of said hydrocracked intermediate product to the decarboxylation section, wherein said decarboxylation section contains a catalytically active material comprising less than 1 wt%, 0.5 wt% or 0.1wt% Co, Mo or W.