CLAIMS

1. A method for producing renewable aviation fuel or components thereto, the method comprising the following steps:

a) providing a renewable feedstock,

b) pre-treating the renewable feedstock by reducing the amount of impurities therein not to include: more than 10 w-ppm alkali metal and alkaline earth metal impurities, calculated as elemental alkali metals and alkaline earth metals; more than 10 w-ppm other metals, calculated as elemental metals; more than 1000 w-ppm nitrogen containing impurities, calculated as elemental nitrogen; more than 30 w-ppm phosphorus containing impurities, calculated as elemental phosphorus; more than 5 w-ppm silicon containing impurities, calculated as elemental silicon to produce a pre-treated feedstock,

c) subjecting the pre-treated feedstock to hydrodeoxygenation reaction conditions to produce a hydrodeoxygenated stream, wherein the hydrodeoxygenation reaction conditions comprise one or more of:

   a. a temperature in the range from 250 °C to 400 °C,
   b. a pressure in the range from 10 bar to 200 bar,
   c. a WHSV in the range from 0.25 $h^{-1}$ to 3 $h^{-1}$,
   d. a $H_2$ flow from 350 to 1500 N-L $H_2$/L feed, and
   e. a hydrodeoxygenation catalyst selected from Pd, Pt, Ni, Co, Mo, Ru, Rh, and W or any combination thereof, on a support

   to produce hydrodeoxygenated stream,

d) subjecting the hydrodeoxygenated stream to a gas-liquid separation thereby producing a gaseous stream and a hydrodeoxygenated liquid stream,

e) subjecting the hydrodeoxygenated liquid stream to hydroisomerization reaction in a presence of a hydroisomerisation catalyst, comprising a noble metal, a 12-member ring ZSM-12 zeolite with pore size below 0.7 nm, aluminium content from 0.1 wt.-% to 1.5 wt.%, Si to Al ratio from 30 to 60, and ratio of the Bronsted acid sites to the Lewis acid sites from 1.7 to 4, measured by pyridine FT-IR, and acidity from 180 µmol/g to 500 µmol/g measured with $NH_3$-TPD method wherein acidity is calculated

from the amount of $NH_3$ adsorbed at 200 °C and desorbed between 100 °C and 500 °C, on a support, and hydrogen in a pressure in the range from 30 bar to 40 bar, at a temperature in a range from 270 °C to 310 °C to produce a hydroisomerized stream,

f) optionally subjecting the hydroisomerized stream to stabilization, to produce a stabilized hydroisomerized stream, and

g) separating from the hydroisomerized stream, or the stabilized hydroisomerized stream, the renewable aviation fuel, or components thereto, wherein the renewable aviation fuel or components thereto comprises renewable C5-C9 hydrocarbons suitable for aviation gasoline or components thereto, and renewable C10-C16 hydrocarbons suitable for jet fuel or components thereto.

2. The method according to claim 1, wherein the step e) further comprises separating from the hydroisomerized stream or from the stabilized hydroisomerized stream a fraction rich in renewable C1-C4 hydrocarbons.

3. The method according to claim 1 or 2 wherein in step c) temperature is from 260 °C to 380 °C, preferably from 280 °C to 360 °C, such as from 300 °C to 330 °C, pressure is from 20 bar to 100 bar, preferably from 20 bar to 80 bar, a weight hourly space velocity (WHSV) is in the range from 0.5 $h^{-1}$ to 3.0 $h^{-1}$, preferably from 0.7 $h^{-1}$ to 2.5 $h^{-1}$, most preferably from 1.0 $h^{-1}$ to 2.0 $h^{-1}$ and $H_2$ flow is in the range from 350 to 1100 N-L $H_2$/L feed, preferably from 350 to 1000 N-L $H_2$/L feed.

4. The method according to any one of claims 1 to 3, wherein the renewable feedstock is sustainable feedstock selected from feedstocks listed in Annex IX, Part A or Annex IX, Part B of the Renewable Energy Directive (EU) 2018/2001 and mixtures thereof.

5. The method according to any one of claims 1 to 4, wherein the feedstock is selected from waste and residues of animal fat or oil, plant fat or oil, and fish fat or oil, and mixtures thereof, preferably the feedstock is selected from palm oil residues and wastes, such as palm effluent sludge, palm oil mill effluent, sludge palm oil, palm oil fatty acid, tall oil material, used cooking oil, acid oils, animal fats, such as brown grease, spent bleaching earth oil, technical corn oil.

6. The method according to any one of claims 1 to 5, wherein the feedstock comprises triglycerides and/or free fatty acids.

7. The method according to any one of claims 1 to 6, wherein the noble metal comprises a Group VIII metal preferably selected from palladium and/or platinum, more preferably platinum, and wherein content of the noble metal of the hydroisomerization catalyst is preferably from 0.1 wt-% to 3.0 wt-% based on the weight of the 12-member ring zeolite.

8. The method according to any one of claims 1 to 7, wherein the support is selected from alumina, silica, and silica-alumina, preferably alumina.

9. The method according to any one of claims 1 to 8, wherein BET surface area of the hydroisomerization catalyst is 200-380 $m^2/g$ determined by nitrogen physisorption.

10. The method according to any one of claims 1 to 9, wherein the hydroisomerization reaction comprises a temperature in the range from 275 °C to 300 °C.

11. The method according to any one of claims 1 to 10, wherein the hydroisomerized stream comprises at least 95 wt-% C5-C28 *i*-paraffins.

12. The method according to any one of claims 1 to 11, wherein the renewable aviation fuel comprises at least 40 wt-% *i*-paraffins comprising at least two *i*-methyl groups.

13. The method according to any one of claims 1 to 12, wherein WHSV of the hydroisomerization reaction of step e) is from $1h^{-1}$ to $10\ h^{-1}$.

14. Use of a catalyst comprising a noble metal, wherein the noble metal comprises a Group VIII metal preferably selected from palladium and/or platinum, more preferably platinum, a 12-membered ring ZSM-12 zeolite with pore size below 0.7 nm, aluminium content from 0.1 wt.-% to 1.5 wt.%, Si to Al ratio from 30 to 60, ratio of the Bronsted acid sites to the Lewis acid sites from 1.7 to 4, measured by pyridine FT-IR, and acidity from 180 µmol/g to 500 µmol/g measured with $NH_3$-TPD method, wherein acidity is calculated from the amount of $NH_3$ adsorbed at 200 °C and desorbed between 100 °C and 500 °C, on a support for producing renewable aviation fuel from a renewable paraffinic feed by hydroisomerization at a temperature in a range from 270 °C to 310 °C in presence of hydrogen flow in a pressure in the range from 30 bar to 40 bar.

15. The use according to claim 14, wherein BET surface area of the zeolite is 200-380 $m^2/g$ determined by nitrogen physisorption.