

Claims

[Claim 1] A method for producing a bio-jet fuel, comprising a crude oil preparation step of obtaining a crude oil by a decarboxylation treatment of a raw oil containing a triglyceride and/or a free fatty acid by using a fat and oil decarboxylation decomposition catalyst comprising any one of magnesium hydroxide, oxide, and carbonate, and a reaction step of hydrogenating, isomerizing, and decomposing the crude oil, by using a hydrogenation catalyst comprising Ni and Pd and an isomerization catalyst comprising zeolite in a hydrogen atmosphere under conditions of a reaction temperature of 180°C to 350°C and a pressure of 0.1 MPa to 30 MPa.

[Claim 2] The method for producing a bio-jet fuel according to claim 1, wherein the hydrogenation, isomerization and decomposition are performed by use of a hydro-isomerization catalyst comprising a hydrogenation catalyst and an isomerization catalyst in the reaction step.

[Claim 3] The method for producing a bio-jet fuel according to claim 2, wherein the hydrogenation, isomerization and decomposition are simultaneously performed by using a hydro-isomerization catalyst comprising a hydrogenation catalyst and an isomerization catalyst in the reaction step.

[Claim 4] The method for producing a bio-jet fuel according to any one of claims 1 to 3, wherein the crude oil obtained by a decarboxylation treatment of a raw material oil containing a triglyceride and/or a free fatty acid satisfies the following requirements a) to e):

- a) comprising a hydrocarbon compound having 16 or more carbon atoms;
- b) having a pour point of -15°C or more;
- c) having an aromatic hydrocarbon content rate of 1 to 15 mass%;
- d) having an acid value of 0 to 20 mg-KOH/g-oil; and

e) having a cyclic compound content rate of 15 mass% or lower.

[Claim 5] The method for producing a bio-jet fuel according to any one of claims 1 to 4, wherein the reaction in the reaction step is performed at 0.5 MPa to 3 MPa.

[Claim 6] The method for producing a bio-jet fuel according to any one of claims 2 to 5, wherein the hydro-isomerization catalyst is a mixed catalyst having a mixing ratio of hydrogenation catalyst: isomerization catalyst of 5:95 to 95:5.

[Claim 7] The method for producing a bio-jet fuel according to any one of claims 2 to 6, wherein the hydro-isomerization catalyst is a composite of a hydrogenation catalyst and an isomerization catalyst.

[Claim 8] The method for producing a bio-jet fuel according to any one of claims 2 to 7, wherein the hydrogenation catalyst is powderized so as to have a particle size smaller than a particle size of the isomerization catalyst, and is attached to or supported on a surface of the isomerization catalyst.

[Claim 9] The method for producing a bio-jet fuel according to any one of claims 1 to 8, wherein a liquid hourly space velocity on a catalyst bed is 0.1 to 10 h⁻¹ in the reaction step.

[Claim 10] The method for producing a bio-jet fuel according to any one of claims 1 to 6 and 8 or 9, wherein a refined oil obtained in the reaction step satisfies the following requirements A) to E):

- A) comprising 60 mass% or more of a hydrocarbon compound having 9 to 15 carbon atoms;
- B) having a pour point of -40°C or lower;
- C) having an aromatic hydrocarbon content rate of 0.5 mass% or lower;
- D) having an acid value of 0.015 mg-KOH/g-oil or lower; and
- E) having a cycloparaffin content rate of 15 mass% or lower.