significantly lower fluorine content than the full boiling range. As the upgraded product boiling above the jet range has a significantly lower content of fluorine hydrocracking of this material into jet range boiling material will result in jet range product with a low fluorine content. This will result in increased production of jet fuel with a reduced fluorine content. The standard solution is to hydroprocess the renewables, but it has turned out that even at very severe conditions (one or more of high activity catalyst, high pressure and high temperature in the reactor) it is very difficult to reduce the fluorine in the jet range to below 2 wt ppm.

So, the present disclosure relates to a process for providing a jet fuel fraction with a low content of fluorine from a solid renewable feedstock, said process comprising the steps of:

- feeding a liquid oil stream comprising at least 5 ppm_{wt} fluorine, 25 ppm_{wt} fluorine, or 50 ppm_{wt} fluorine, said liquid oil stream being derived from said solid renewable feedstock to a fractionation section, and subjecting it to fractionation, to provide at least a light jet fuel fraction and a heavy jet fuel fraction, wherein the fluorine content in the heavy fraction is lower than the fluorine content in the liquid oil stream.

In one aspect, the present disclosure relates to a process for providing a jet fuel fraction with a low content of fluorine from a solid renewable feedstock, said process comprising the steps of:

- feeding a liquid oil stream comprising at least 5 ppm_{wt} fluorine, 25 ppm_{wt} fluorine, or 50 ppm_{wt} fluorine, said liquid oil stream being derived from said solid renewable feedstock to a fractionation section, and subjecting it to fractionation by distillation, to provide at least a light jet fuel fraction and a heavy jet fuel fraction, wherein the fluorine content in the heavy fraction is lower than the fluorine content in the liquid oil stream.

Additional aspects of the disclosure are presented in the following description text, figures and claims.

LEGENDS TO THE FIGURE

The technology is illustrated by means of the following schematic illustrations, in which:

Figure 1 shows the product fluorine content from experiment 1

Figure 2 shows the product fluorine content from experiment 2

Figure 3 shows the product fluorine content from experiment 4

Figures 4 and 8 show a conventional layout.

Figures 5-7 and 9-11 show various layouts according to the invention.

CLAIMS

1. A process for providing a jet fuel fraction with a low content of fluorine from a solid renewable feedstock, said process comprising the steps of:

- feeding a liquid oil stream comprising at least 5 ppm_{wt} fluorine, 25 ppm_{wt} fluorine, or 50 ppm_{wt} fluorine, said liquid oil stream being derived from said solid renewable feedstock to a fractionation section, and subjecting it to fractionation by distillation, to provide at least a light jet fuel fraction and a heavy jet fuel fraction, wherein the fluorine content in the heavy fraction is lower than the fluorine content in the liquid oil stream.

2. The process according to claim 1, further comprising the step of:

- subjecting the liquid oil stream to a stabilization step in a stabilization section, prior to the fractionation step.

3. The process according to any one of the preceding claims, further comprising the step of:

- subjecting the liquid oil stream to a catalytic hydroprocessing step in a hydroprocessing section, prior to the fractionation step, and preferably after the stabilization step.

4. The process according to any one of the preceding claims, wherein the renewable feedstock comprises one or more of:

- a lignocellulosic biomass such as wood products, algae, grass, forestry waste and/or agricultural residue;
- recycled solid waste, in particular the organic portion thereof, where the recycled solid waste is defined as a feedstock containing materials of items discarded by the public, such as mixed recycled solid waste given in EU Directive 2018/2001 (RED II), Annex IX, part A; or
- nitrogen-rich renewable feedstock such as manure or sewage sludge.

5. The process according to any one of the preceding claims, wherein the fractionation cut point between light and heavy jet fuel fractions is in the range from 175 to 225°C, and wherein, with a given fractionation cut point, the light jet fuel fraction will contain at least 75% of material boiling below the specified cut point and the heavy jet fraction will contain at least 75% of material boiling above the cut point.

6. The process according to any one of the preceding claims, wherein the heavy jet fuel fraction comprises less than 2 wt ppm, such as less than 1 wt ppm fluorine.

7. The process according to any one of claims 2-6, wherein the liquid oil stream – at the inlet of the stabilization section – comprises more than 5 wt ppm fluorine, such as more than 25 wt ppm fluorine, more than 50 wt ppm fluorine, or more than 75 wt ppm fluorine.

8. The process according to any one of the preceding claims, wherein said hydroprocessing section comprises:

- a guard unit
- a first hydroprocessing unit
- a second hydroprocessing unit

and wherein said liquid oil product stream is passed through said guard unit, said first hydroprocessing unit and said second hydroprocessing unit in order.

9. The process according to claim 8 wherein said process further comprises a step of washing the liquid oil product stream with water between the first and the second hydroprocessing units.

10. The process according to any one of claims 8-9, wherein said process further comprises a step of washing the liquid oil product stream with water between the second hydroprocessing unit and the fractionation section.

11. The process according to any one of the preceding claims, wherein the fractionation step further provides one or more streams selected from: a gas stream, a naphtha stream, a diesel stream and a fuel oil stream.

12. The process according to claim 11, further comprising a step of feeding at least a portion of the diesel stream and/or at least a portion of the fuel oil stream to a hydrocracking section so as to provide a cracked stream, and optionally feeding at least a portion of said cracked stream to the second hydroprocessing unit.

13. The process according to any one of claims 8-12, wherein said hydroprocessing section comprises a hydrocracking section downstream said second hydroprocessing unit, said process comprising a step of cracking the liquid oil product stream from the second hydroprocessing unit.

14. The process according to any one of the preceding claims, wherein said hydroprocessing section comprises a stripper column arranged between the first hydroprocessing unit and the second hydroprocessing unit, said stripper column being arranged to receive a liquid oil product stream from the first hydroprocessing unit and fractionate it to a first gas stream, a light oil product stream and a partly hydrotreated bottom product, wherein at least a portion of the partly hydrotreated bottom product is arranged to be fed to the second hydroprocessing unit.

15. The process according to any one of the preceding claims, wherein said process further comprises a step of thermal decomposition of the solid renewable feedstock to produce said liquid oil stream, preferably wherein said thermal decomposition comprises a pyrolysis step and/or a hydrothermal liquefaction step.

16. The process according to any one of the preceding claims, further comprising a step of mixing at least a portion of the heavy jet fuel fraction with at least a portion of the light jet fuel fraction to provide a combined jet fuel fraction.