Title: Method for production of aviation fuel

Conversion of renewables in hydroprocessing has so far been focused on making diesel, since the paraffins corresponding to the typical fatty acids of biological materials such as vegetable oils and animal fats (C14, C16 and C18) typical boil from 250°C to 320°C, corresponding well with typical diesel products boiling from 150°C to 380°C. Jet fuel products require a boiling range of 120ºC to 300ºC or 310°C, which means that the heavy part of a paraffins from renewable feedstocks needs to be converted into lighter materials to produce only jet fuel. A further challenge in the production of jet fuel from renewables is the discovery of a surprisingly high production of aromatics, during hydrotreatment of renewable feedstocks. The present disclosure relates to a process having a high yield of renewable jet fuel meeting typical product requirements by converting the heavy material to lighter material and by limiting the amount of aromatics in the product.

Summary

In an aspect of the present disclosure, there is provided a process for production of a hydrocarbon fraction suitable for use as jet fuel (80, 224) from an oxygenate feedstock (2, 202), comprising the steps of

a. combining the feedstock (2, 202) with an amount of a hydrocracked intermediate product (14, 206) to form a combined feedstock (6, 204), directing the combined feedstock (6, 204) to contact a material catalytically active in hydrodeoxygenation (HDO) under hydrodeoxygenation conditions to provide a hydrodeoxygenated intermediate product (22, 212),

b. fractionating said hydrodeoxygenated intermediate product (22, 212) in at least two fractions, including a first fraction (80, 224) of which at least 90% boils below a defined boiling point and a second fraction (72, 226) of which at least 90% boils above said defined boiling point,

c. directing at least an amount of said second fraction (72, 226) to contact a material catalytically active in hydrocracking (HDC) under hydrocracking conditions to provide the hydrocracked intermediate product (14, 206).

In another aspect of the present disclosure, there is provided a process plant for production of a hydrocarbon fraction (80, 224) from an oxygenate feedstock (2, 202), said process plant comprising a hydrodeoxygenation section (HDO), a hydrocracking section (HDC) and a fractionation section (FRAC), said process plant being configured for

a. directing the feedstock (2, 202) and an amount of a hydrocracked interme-diate product (14, 206) to the hydrodeoxygenation section (HDO) to provide a hydrodeoxygenated intermediate product (22, 212),

b. separating the hydrodeoxygenated intermediate product (22, 212) in said fractionation section (FRAC) to provide at least two fractions, including a low boiling product fraction (80, 224) and a high boiling product fraction (68, 226),

c. directing at least an amount of the high boiling product fraction (68, 226) to the hydrocracking section (HDC) to provide a hydrocracked intermediate product (14, 206),

d. directing at least an amount of said hydrocracked intermediate product (14, 206) as said further feedstock.

Description

It is known to produce jet fuel from renewable feedstocks by co-producing some jet fuel in a unit designed for making diesel. However, there is an interest in making a full conversion from renewable feedstocks boiling mainly in the diesel range to jet fuel products, which requires significant conversion.

The standard controlling the quality of jet fuel originating from hydroprocessed oxygenates such as esters and fatty acids is ASTM D7566, A2.1, which inter alia specifies the boiling point curve and composition. Most of these properties can be easily met by hydrotreating and fractionation. However, special care need to be taken to meet the freezing point (FP) requirement of max -40°C and the total aromatics content of max 0.5wt%. In addition, the standard requires an amount of low boiling product by requiring T_{10}, i.e. the temperatures at which 10% has been distilled according to ASTM D86, to be below 205°C. The final boiling point (FBP) is specified as 300ºC, according to ASTM D86, which means that all material distilling above 300ºC according to ASTM D86 needs to be converted into lighter components to fall into the jet fuel range.

Now according to the present disclosure it is proposed to carry out jet fuel production in a reverse stage two-stage configuration, where the feed is hydrodeoxygenated and optionally isomerized in the first stage, and after removal of sour gases the product is