Title: Method for co-production of aviation fuel and diesel

Conversion of oxygenates such as 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, which means that an amount of the heavy part of paraffins from renewable feedstocks needs to be converted into lighter materials to produce only jet fuel. The present disclosure relates to a process having a high yield of a mix of liquid transportation fuels, especially renewable diesel and renewable jet fuel meeting typical product requirements by selectively converting the heavy material to lighter material.

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 (124) from an oxygenate feedstock (102), comprising the steps of

a. combining the feedstock (102) with an amount of a hydrocracked intermediate product (112) and optionally a liquid diluent to form a combined feedstock (104), directing said combined feedstock (104) to contact a material catalytically active in hydrodeoxygenation (HDO) under hydrotreating conditions to provide a hydrodeoxygenated intermediate product (106),

b. separating said hydrodeoxygenated intermediate product (106) in at least two fractions including a vapor fraction and a liquid fraction (108),

c. optionally providing an amount of said liquid fraction (108) as said liquid diluent, directing at least an amount of said liquid fraction (108) to contact a material catalytically active in isomerization (ISOM) under isomerization conditions to providean isomerized intermediate product (116),

d. fractionating said isomerized intermediate product (116) to provide at least a hydrocarbon suitable for use as jet fuel (124) and a bottom fraction (126),

e. directing at least an amount of said bottom fraction (126) to contact a mate-rial catalytically active in hydrocracking (HDC) under hydrocracking conditions to provide the hydrocracked intermediate product (112).

In another aspect of the present disclosure, there is provided a process plant for production of a hydrocarbon fraction suitable for use as jet fuel (124) from an oxygenate feedstock (102), said process plant comprising a hydrocracking section (HDC), a hydrodeoxygenation section (HDO), a separator section, an isomerization section (ISOM) and a fractionation section (FRAC), said process plant being configured for

a. directing a recycled product (126) to a hydrocracking section (HDC) to provide a hydrocracked intermediate product (112),

b. directing the feedstock (102), said hydrocracked intermediate product (112), and optionally a further recycled liquid diluent (126) to the hydrodeoxygenation section (HDO) to provide a hydrodeoxygenated intermediate product (106),

c. separating said hydrodeoxygenated intermediate product (106) in a vapor fraction and a liquid fraction (108) in said separator section (SEP),

d. directing at least an amount of said liquid hydrodeoxygenated intermediate product (108) to contact a material catalytically active in isomerization (ISOM) under isomerization conditions to provide an intermediate isomerized product (116), and

e. fractionating said isomerized intermediate product (116) in said fractionation section (FRAC) providing at least a hydrocarbon fraction suitable for use as jet fuel (124) and said recycled product (126).

Description

During hydrotreatment of renewable feedstocks in a unit designed for making diesel, an amount of jet fuel is often also produced. However, there is an interest in making a flexible and well controlled conversion from the intermediate products of 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 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 0.5 wt/wt%. In addition, the standard requires an amount of low boiling product by requiring T_{10}, i.e. the temper-

atures below which 10% boils, to be below 205°C. The final boiling point (FBP) is specified as 300ºC, according to ASTM D86, which means that all material boiling above 300ºC 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 combined production of diesel and jet fuel in a reverse stage two-stage configuration, where the feed is hydrodeoxygenated in the first stage, and after removal of sour gases the product is isomerized and possibly hydrodearomatized and finally fractionated. The heavy fraction of the product is recycled upstream the hydrodeoxygenation catalyst for conversion