US 2002/112990 A1 discloses a process for hydroprocessing fossil fuels in two or more hydroprocessing stages wherein the liquid and vapor products from the first stage are sent to a separation zone (S) wherein a liquid phase fraction is separated from a vapor phase fraction which contains vaporized heavy hydrocarbon components. The vapor phase fraction is passed to a sorption zone (ST) under the presence of a sorption agent (STA) wherein at least a portion of the heavy hydrocarbon components is removed. Both the liquid phase fraction and the sorbed heavy hydrocarbon components are sent to at least one additional hydroprocessing stage. Optionally there is partial condensation and reflux in the sorption zone (ST) for removing the high boiling hydrocarbon components (heavy tail) from the vapor fraction. There is no stripping nor reflux in the separation zone (S), hence the impurities H_2S, H_2O, NH_3, CO and CO_2 of the bottom stream would go directly to the second hydroprocessing stage.

US 2005/167334 A1 discloses the hydrotreament of fossil fuels, in which the hydrotreament is hydro-desulphurization, hydro-denitrogenation, hydro-demetallization (to eliminate one or more metals such as vanadium, nickel, iron, sodium, titanium, silicon, copper), and hydrodearomatization. The hydrotreatment comprises at least two reaction steps with intermediate stripping of the effluent from the first step and including a reflux, each step being carried out with a hydrogen recycle loop that is exclusive to that step, thereby eliminating part of the H_2S formed. The hydrotreatment in the first reaction step does not include HDO, thus the effluent thereof does not contain additional impurities in the form of CO, CO_2 in addition to H_2O.

It is an object of the present invention to significantly reduce the content of the impurities H_2S, H_2O, NH_3, CO and CO_2 which may be in contact with the noble metal catalysts used in the dewaxing step.

This and other objects are solved by the present invention.

Summary

In one aspect of the present disclosure, there is provided a process for producing a hydrocarbon product, said process comprising:

i) passing a feedstock originating from a renewable source and/or from a fossil source through a hydroprocessing step for producing a main hydrotrotreated stream; said hydroprocessing step comprising:
- passing the feedstock through one or more catalytic hydrotreating units under the addition of hydrogen for producing a first hydrotreated stream, said hydrotreated stream comprising the impurities: H_2S, NH_3, CO, CO_2 and H_2O;
- passing the first hydrotreated stream to a first separation step comprising the use of a separation unit, for removing the impurities;
- withdrawing from said first separation step an overhead stream and separating an overhead hydrocarbon liquid stream thereof of which at least a portion is passed as a reflux stream to said first separation unit;
- withdrawing from said first separation step a bottom stream;
- passing at least a portion of said bottom stream to a dewaxing step comprising the use of one or more catalytic hydrotreating units under the addition of hydrogen for producing said main hydrotreated stream;ii) passing the main hydrotreated stream to a second separation step for producing said hydrocarbon product;
wherein the one or more catalytic hydrotreating units for producing said first hydrotreated stream comprises hydrodeoxygenation (HDO) and optionally also hydrodenitrification (HDN);
wherein the one or more catalytic hydrotreating units in the dewaxing step for producing said main hydrotreated stream comprises hydrodewaxing (HDW) under the presence of a noble metal catalyst, and optionally also hydrocracking (HCR);
and wherein the entire overhead hydrocarbon liquid stream is passed as reflux stream to the separation unit.

Description

Accordingly, the present invention provides a process for producing a hydrocarbon product, said process comprising: