

DESCRIPTION

TITLE: AROMATIC AND NAPHTHENIC SOLVENTS BASED ON ETHANOL

TECHNICAL FIELD OF THE INVENTION

5 The invention relates to a method for preparing an aromatic or naphthenic hydrocarbon solvent from an ethanol-type hydrocarbon feedstock and a hydrocarbon solvent obtained from an ethanol-type feedstock.

PRIOR ART

10 Specialty fluids are liquids used as industrial fluids, agricultural fluids, and fluids for domestic use generally obtained from fossil hydrocarbons transformed by refining but also from many products resulting from the oligomerization of olefins containing 2 to 4 carbons and also from synthesis hydrocarbons resulting from the transformation of natural gas or from the synthesis gas coming from biomass and/or coal. The above include drilling fluids, industrial
15 lubricants, fluids for formulations intended for the automotive field, phytosanitary products, base fluids for ink formulations, fuels for domestic applications, extender oils for putties, viscosity depressants for resin formulations, pharmaceutical compositions and compositions intended for food contact, fluids for cosmetic formulations, heat-transfer fluids, dielectric fluids, lubricant base fluids, degreasing fluids.

20 The industry is increasingly looking to replace fossil products with bio-based products (which are not fossil products).

 Document WO2016185047 describes a heavy hydrocarbon fluid having more than 95% by weight of isoparaffins and less than 100 ppm of aromatics, obtained by a method of hydrodeoxygenation and hydroisomerization of a biomass.

25 Document WO 03/074634 describes hydrocarbon fluids obtained from diesel cuts obtained by hydrocracking a vacuum gas oil (VGO).

 Document WO 2011/061575 describes hydrocarbon fluids obtained by hydrogenation of a low sulfur feedstock.

30 None of the prior art documents proposes a method for preparing a fluid from a hydrocarbon feedstock as defined in the present invention.

 The goal of the present invention is to provide a method for the preparation of a bio-based aromatic or naphthenic hydrocarbon solvent and a bio-based aromatic or naphthenic hydrocarbon solvent having a composition and properties suitable for the intended applications.

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SUMMARY OF THE INVENTION

The invention relates to a preparation method for hydrocarbon cuts, said method comprising:

a) providing a hydrocarbon feedstock originating from ethanol comprising:

- from 20 to 60 % by weight of aromatic compounds;
- from 20 to 60 % by weight of non-cyclic paraffins; and
- from 2 to 20 % by weight of naphthenes,

with respect of the total weight of the hydrocarbon feedstock,

b) optionally, a step of hydrogenation of the hydrocarbon feedstock originating from ethanol provided during step a) in order to obtain a hydrogenated hydrocarbon feedstock;

c) a distillation step

(i) of the hydrocarbon feedstock originating from ethanol during step a) or

(ii) of the hydrogenated hydrocarbon feedstock of step b),

in order to obtain at least one hydrocarbon cut having a difference of less than 100°C

between the final boiling point thereof and the initial boiling point thereof.

According to one embodiment, step a) comprises a preparation step for preparing the hydrocarbon feedstock, said preparation step preferably comprising a conversion step for converting ethanol into ethylene and an oligomerization step for oligomerizing ethylene, the ethanol preferably being bioethanol.

Preferably, the hydrocarbon feedstock during step a) has one or more of the following characteristics:

- a content of aromatic compounds ranging from 30 to 60% by weight, preferably from 35 to 55% by weight, with respect to the total weight of the hydrocarbon feedstock, and/or

- a content of non-cyclic paraffins ranging from 20 to 60% by weight, preferably from 30 to 40% by weight, with respect to the total weight of the hydrocarbon feedstock, and/or

- a naphthene content ranging from 2 to 20% by weight, preferably from 5 to 15% by weight, with respect to the total weight of the hydrocarbon feedstock, and/or

- an initial boiling point in the range from 20 to 250°C, preferably from 30 to 200°C, and/or

- a final boiling point in the range going from 150 to 400°C, preferably from 180 to 390°C, and/or

- a boiling range having an extent greater than or equal to 100°C, preferably greater than or equal to 120°C, more preferably greater than or equal to 150°C.

Preferably, the hydrocarbon feedstock of step a) has an initial boiling point and a final boiling point within the range from 20 to 250°C, preferably from 30 to 230°C and has a

difference greater than or equal to 150°C between the final boiling point thereof and the initial boiling point thereof.

According to one embodiment, the hydrogenation step b) is present and is carried out at a temperature ranging from 60 to 180°C and at a pressure ranging from 20 to 160 bar.

5 According to one embodiment when the hydrogenation step b) is present, the method further comprises a recycling of part of the hydrogenated hydrocarbon feedstock obtained at the end of hydrogenation step b) in order to be mixed with the hydrocarbon feedstock provided in step a), preferably the mixture being carried out with a hydrocarbon feedstock weight ratio provided during step a) hydrogenated hydrocarbon feedstock obtained at the end of step b),
10 ranging from 50/50 to 90/10.

According to one embodiment when the hydrogenation step b) is present, the hydrogenated hydrocarbon feedstock obtained at the end of the hydrogenation step comprises less than 500 ppm by weight of aromatics, preferably less than 300 ppm by weight of aromatics, else preferably less than 100 ppm by weight of aromatics, relative to the total weight
15 of the hydrogenated hydrocarbon feedstock.

According to one embodiment when the hydrogenation step b) is present, at least two hydrocarbon cuts are prepared, preferably said hydrocarbon cuts are:

(i) a CA1 cut having an initial boiling point and a final boiling point in the range going from 150 to 190°C, preferably from 155 to 185°C, said CA1 cut having a boiling range extent
20 preferably going from 10 to 30°C, preferably from 15 to 25°C;

(ii) a CA2 cut having an initial boiling point and a final boiling point in the range going from 185 to 250°C, preferably from 190 to 240°C, said CA2 cut having a boiling range extent preferably going from 20 to 70°C, preferably from 30 to 50°C.

According to one embodiment when step b) is not carried out, the distillation step is
25 carried out directly on the hydrocarbon feedstock of step a) and at least two hydrocarbon cuts are prepared, preferably at least three hydrocarbon cuts are prepared, or more preferably said cuts are:

(i) a CN1 cut having an initial boiling point and a final boiling point in the range going from 30 to 100°C, preferably from 40 to 90°C, said CN1 cut having a boiling range extent
30 preferably going from 10 to 50°C, preferably from 20 to 40°C;

(ii) a CN2 cut having an initial boiling point and a final boiling point in the range going from 90 to 165°C, preferably from 95 to 160°C, said CN2 cut having a boiling range extent preferably going from 30 to 70°C, preferably from 40 to 60°C;

(ii) a CN3 cut having an initial boiling point and a final boiling point in the range going
35 from 160 to 250°C, preferably from 165 to 230°C, said CN3 cut having a boiling range extent preferably going from 30 to 70°C, preferably from 40 to 60°C.

The invention also relates to a hydrocarbon cut having a difference of less than 100°C between the final boiling point and the initial boiling point, said hydrocarbon cut comprising:

a) a biocarbon content greater than or equal to 90% by weight, preferably greater than or equal to 95% by weight, with respect to the total weight of carbon atoms,

b) a content of naphthenes and of aromatics chosen from:

b1) a naphthene content ranging from 2 to 20% by weight and a content of aromatics ranging from 30 to 60% by weight, with respect to the total weight of the hydrocarbon cut or

b2) a naphthene content of 40 to 80% by weight and a content of aromatics of 500 ppm by weight or less, with respect to the total weight of the hydrocarbon cut,

c) a content of non-cyclic paraffins ranging from 20 to 60% by weight.

Preferably, the hydrocarbon cut according to the invention is chosen from the following cuts:

(i) a CA1 cut having an initial boiling point and a final boiling point in the range going from 150 to 190°C, preferably from 155 to 185°C, said CA1 cut having a boiling range extent preferably going from 10 to 30°C, preferably from 15 to 25°C, said CA1 cut having an aromatic content ranging from 30 to 60% by weight, preferably from 35 to 55% by weight, relative to the total weight of the CA1 cut;

(ii) a CA2 cut having an initial boiling point and a final boiling point in the range going from 185 to 250°C, preferably from 190 to 240°C, said CA2 cut having a boiling range extent preferably going from 20 to 70°C, preferably from 30 to 50°C, said CA2 cut having an aromatic content going from 30 to 60% by weight, preferably from 35 to 55% by weight, relative to the total weight of the CA2 cut;

(iii) a CN1 cut having an initial boiling point and a final boiling point in the range going from 30 to 100°C, preferably from 40 to 90°C, said CN1 cut having a boiling range extent preferably going from 10 to 50°C, preferably from 20 to 40°C, said CN1 cut having an aromatic content of less than or equal to 500 ppm, preferably less than or equal to 300 ppm, preferably less than or equal to 100 ppm by weight, relative to the total weight of the CN1 cut;

(iv) a CN2 cut having an initial boiling point and a final boiling point in the range going from 90 to 165°C, preferably from 95 to 160°C, said CN2 cut having a boiling range extent preferably from 30 to 70°C, preferably ranging from 40 to 60°C, said CN2 cut having an aromatic content of less than or equal to 500 ppm, preferably less than or equal to 300 ppm, preferably less than or equal to 100 ppm by weight, relative to the total weight of the CN2 cut;

(v) a CN3 cut having an initial boiling point and a final boiling point in the range going from 160 to 250°C, preferably from 165 to 230°C, said CN3 cut having a boiling range extent preferably from 30 to 70°C, preferably going from 40 to 60°C, said CN3 cut having an aromatic content of less than or equal to 500 ppm, preferably less than or equal to 300 ppm.

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Preferably, the hydrocarbon cut according to the invention can be obtained by the method according to the invention.

10 A further subject matter of the invention relates to the use of a hydrocarbon cut according to the invention, as a solvent or as a thermal fluid or as an additive in the fuel formulation, for example as a solvent for the chemical industry, as an extraction solvent, as a solvent in an ink formulation, in an adhesive formulation, in a composition of a paint, of a material coating, of a material treatment, of a putty, of polymerization, of aerosol, of cleaning or of water treatment.

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The invention can be used for supplying an aromatic or naphthenic solvent from a biosourced hydrocarbon feedstock coming from the conversion of ethanol.

DETAILED DESCRIPTION OF THE INVENTION

20 The invention relates to a preparation method for preparing a hydrocarbon solvent, said method comprising:

a) providing a hydrocarbon feedstock originating from ethanol having an initial boiling point and a final boiling point in the range from 20 to 250°C and comprising:

- from 20 to 60 % by weight of aromatic compounds;
- 25 - from 20 to 60 % by weight of non-cyclic paraffins; and
- from 2 to 20 % by weight of naphthenes,

with respect to the total weight of the hydrocarbon feedstock,

b) optionally, a step of hydrogenation of the hydrocarbon feedstock originating from ethanol provided during step a) in order to obtain a hydrogenated hydrocarbon feedstock;

30 c) a distillation step:

- (i) of the hydrocarbon feedstock originating from ethanol during step a) or
- (ii) of the hydrogenated hydrocarbon feedstock during step b),

in order to obtain at least one hydrocarbon cut having a difference of less than 100°C between the final boiling point thereof and the initial boiling point thereof.

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Thereby, according to one embodiment, the method comprises a stage of distillation of the hydrocarbon feedstock provided during step a).

According to one embodiment, the method comprises:

a) a step of hydrogenation of the hydrocarbon feedstock, and

5 b) a step of distillation of the hydrogenated hydrocarbon feedstock coming from step a).

As a preliminary matter, it should be noted that, in the following description and claims, the expression "comprised between" has to be understood as including the limits mentioned.

10 The word "paraffins", as defined by the present invention, refers to branched alkanes (also called iso-paraffins or iso-alkanes) and to unbranched alkanes (also called n-paraffins or n-alkanes).

The word "isoparaffins", as defined by the present invention, refers to non-cyclic branched alkanes.

15 The word "n-paraffins", as defined by the present invention, refers to linear non-cyclic alkanes.

The word "naphthenes", as defined by the present invention, refers to cyclic alkanes or cycloalkanes (non-aromatic), typically containing from 5 to 11 carbon atoms.

20 Within the framework of the present invention, the boiling point is determined according to the standard ASTM D86.

Hydrocarbon feedstock

The method of the invention uses a hydrocarbon feedstock, said hydrocarbon feedstock preferably originating from ethanol.

25 According to one embodiment, the hydrocarbon feedstock has a boiling range having an extent greater than or equal to 100°C, preferably greater than or equal to 120°C, else preferably greater than or equal to 150°C. According to one embodiment, the hydrocarbon feedstock has a boiling range with an extent ranging from 100 to 350°C, preferably from 120 to 300°C, else preferably from 150 to 250°C.

30 The extent of the boiling range refers to the difference between the final boiling point and the initial boiling point.

According to one embodiment, the initial boiling point of the hydrocarbon feedstock lies in the range from 20 to 250°C, preferably from 30 to 200°C.

35 According to one embodiment, the final boiling point of the hydrocarbon feedstock lies in the range from 150 to 400°C, preferably from 180 to 390°C.

According to one embodiment, the hydrocarbon feedstock is chosen from gasoline, jet fuels or gas oils.

Typically, the gasolines have an initial boiling point and a final boiling point in the range from 20 to 250°C, preferably from 30 to 230°C.

5 Typically, jet fuels have an initial boiling point and a final boiling point in the range from 100 to 300°C, preferably from 150 to 250°C.

Typically, diesels have an initial boiling point and a final boiling point in the range from 120 to 400°C, preferably from 150 to 390°C.

10 According to a preferred embodiment, the hydrocarbon feedstock is chosen from gasoline cuts.

According to one embodiment, the hydrocarbon feedstock has a boiling range having an extent greater than or equal to 100°C and comprises:

15 a) from 20 to 60% by weight, preferably from 30 to 55% by weight, of aromatic compounds;
b) from 20 to 60% by weight, preferably from 30 to 50% by weight, of non-cyclic paraffins; and
c) from 2 to 20% by weight, preferably from 5 to 15% by weight, of naphthenes,
relative to the total weight of the hydrocarbon feedstock.

20 According to a particular embodiment, the hydrocarbon feedstock comprises:

a) from 35 to 55% by weight of aromatic compounds;
b) from 30 to 50% by weight of non-cyclic paraffins containing at least 5 carbon atoms; and
c) from 5 to 15% by weight of naphthenes.

25 The content of aromatic compounds, paraffins and/or naphthenes can be determined by gas chromatography.

The aromatic compound or compounds a) are preferably chosen from alkyl benzenes comprising from 7 to 12 carbon atoms. Alkyl benzenes refer to, in a manner known per se, benzene derivatives wherein one or a plurality of hydrogen atoms are replaced by one or a
30 plurality of alkyl groups.

The aromatic compound or compounds may in particular be chosen from toluene, ethylbenzene, xylenes (and in particular 1,2-dimethylbenzene or ortho-xylene, 1,3-dimethylbenzene or meta-xylene and 1,4-dimethylbenzene or para-xylene), 1-ethyl-3-methylbenzene, mesitylene (1,3,5-trimethylbenzene), 1-ethyl-3,5-dimethylbenzene, and
35 mixtures of said compounds.

Mixtures of aromatic compounds are most particularly preferred, and more particularly mixtures of alkyl-benzenes comprising from 8 to 10 carbon atoms such as ethylbenzene, xylenes (and in particular 1.2-dimethylbenzene or ortho-xylene, 1.3-dimethylbenzene or meta-xylene and 1.4-dimethylbenzene or para-xylene), 1-ethyl-3-methylbenzene, mesitylene (1.3,5-trimethylbenzene), and 1-ethyl-3.5-dimethylbenzene.

Preferably, the content of the aromatic compounds a) ranges from 40 to 53% by weight, preferably from 45 to 52% by weight, relative to the weight of the hydrocarbon feedstock.

According to a particular embodiment, the hydrocarbon feedstock defined in the invention also contains non-cyclic paraffins b) containing at least 4 carbon atoms.

The paraffins are preferably chosen from the paraffins comprising from 5 to 12 carbon atoms, more preferentially from 5 to 9 carbon atoms and better from 5 to 8 carbon atoms.

Paraffins can be chosen from n-paraffins (or normal-paraffins, i.e. linear alkanes) and iso-paraffins (i.e. branched alkanes).

Mixtures of n-paraffins and iso-paraffins chosen from same described hereinabove, preferably comprising a major proportion of iso-paraffins, with a weight ratio between the quantity of iso-paraffins and the quantity of n-paraffins greater than or equal to 3, are most particularly preferred, preferably greater than or equal to 4 and better still within the range from 4 to 5, are most particularly preferred.

The hydrocarbon feedstock advantageously contains from 5 to 10% by weight of n-paraffins and from 20 to 45% by weight of iso-paraffins, relative to the total weight of the hydrocarbon feedstock.

Preferably, the content of the paraffins b) ranges from 32 to 45% by weight, more preferably from 35 to 42% by weight, relative to the total weight of the hydrocarbon feedstock.

Typically, the hydrocarbon feedstock defined in the invention further contains naphthenes c).

Preferably, the naphthenes are chosen from cyclic alkanes containing from 5 to 10 carbon atoms, and more preferentially from 6 to 9 carbon atoms.

Preferably, the content of the naphthenes c) ranges from 7 to 13% by weight, more preferentially from 8 to 12% by weight, relative to the total weight of the hydrocarbon feedstock.

According to a preferred embodiment, the hydrocarbon feedstock comes from vegetable raw materials. Same will be referred to as bioethanol.

Bioethanol can for example be produced from the fermentation of sugars, mainly glucose, using conventional or genetically modified yeast strains. Different vegetable raw materials can be used for the production of bioethanol, such as sugar cane, corn, barley, potato waste, sugar beet, wine residues such as grape marc.

The hydrocarbon feedstock used in the invention typically comprises a biocarbon content greater than or equal to 90% by weight, preferably greater than or equal to 95% by weight, advantageously equal to 100% by weight. Such characteristic is usually the consequence of the choice of the origin of the raw material. Thereby, in the case where the hydrocarbon feedstock comes from ethanol of plant origin, the hydrocarbon feedstock will then have a high content of biocarbon.

The method according to the invention may comprise, optionally, a step of preparation of the hydrocarbon feedstock.

Thereby, the hydrocarbon feedstock used in the invention can be prepared by catalytic conversion of ethanol, preferably by catalytic conversion of bioethanol.

The catalytic conversion of ethanol may comprise:

- i) a conversion step for converting ethanol into ethylene,
- ii) a step of oligomerization of ethylene into hydrocarbons.

Hydrogenation of the hydrocarbon feedstock

The method of the invention may, optionally, comprise a step of hydrogenation of the hydrocarbon feedstock. Such step serves to reduce the aromatic content of the hydrocarbon feedstock. Such step can also be called dearomatization or hydrodearomatization.

The hydrogen used in the hydrogenation unit is typically highly purified hydrogen. Highly purified means that hydrogen with a purity for example greater than 99%, even if other grades can also be used.

According to one embodiment, the hydrogenation step is carried out at a temperature ranging from 60 to 180°C and at a pressure ranging from 20 to 160 bar.

According to one embodiment, the hydrogenation step is carried out with an hourly volume rate ranging from 0.2 to 2 h⁻¹, preferably from 0.5 to 1.0 h⁻¹.

According to one embodiment, the hydrogenation conditions are the following:

- Pressure: 20 to 160 bar, preferably 30 to 150 bar and more preferentially 50 to 120 bar;
- Temperature: 60 to 180°C, preferably 70 to 160°C, and more preferentially 90 to 150°C;
- Hourly volume rate (VVH): 0.2 to 5 hr⁻¹, preferably 0.4 to 3 hr⁻¹ and more preferentially 0.5 to 0.8 hr⁻¹;
- hydrogen treatment rate: suitable for the conditions mentioned hereinabove and up to 200 Nm³/tons of feedstock to be treated.

When present, the hydrogenation step is usually carried out using catalysts. Typical hydrogenation catalysts may be either bulk catalysts or supported catalysts and may comprise

the following metals: nickel, platinum, palladium, rhenium, rhodium, nickel tungstate, nickel-molybdenum, molybdenum, cobalt-molybdenum. The supports can be silica, alumina, silica-alumina or zeolites.

5 A preferred catalyst is a nickel catalyst supported on alumina with a specific surface area between varying between 100 and 200 m²/g of catalyst or a nickel bulk catalyst.

Hydrogenation can take place in one or a plurality of reactors in series. The reactors may comprise one or a plurality of catalyst beds. Catalyst beds are generally stationary catalyst beds.

10 The hydrogenation step can be carried out in two or three reactors, preferably three reactors and is more preferentially carried out in three reactors in series.

The first reactor serves for the trapping of sulfur compounds and the hydrogenation of essentially all unsaturated compounds and up to about 90% of the aromatic compounds. The product coming from the first reactor substantially does not contain any sulfur-containing compound. In the second stage, i.e. in the second reactor, the hydrogenation of the aromatics
15 continues and up to 99% of the aromatics are thereby hydrogenated.

The third stage in the third reactor is a finishing stage serving to obtain aromatic content of less than or equal to 500 ppm, preferably less than or equal to 300 ppm, preferentially less than or equal to 100 ppm, more preferentially less than or equal to 50 ppm, and ideally less than or equal to 20 ppm even in the case of products with a high boiling point, for example
20 greater than 300°C.

It is possible to use a reactor that has two or three or a plurality of catalyst beds. The catalysts may be present in variable or essentially equal quantities in each reactor; for three reactors, the quantities as a function of the weight may for example be 0.05-0.5/0.10-0.70/0.25-0.85, preferably 0.07-0.25/0.15-0.35/0.4-0.78 and more preferentially 0.10-0.20/0.20-
25 0.32/0.48-0.70.

It is also possible to use one or two hydrogenation reactors instead of three.

It is also possible for the first reactor to be composed of twin reactors operated alternately. Such mode of operation in particular makes easy loading and unloading of catalysts possible: when the first reactor comprises the catalyst saturated first (substantially all
30 the sulfur is trapped on and/or in the catalyst), same should be changed often.

A single reactor can also be used, wherein two, three or a plurality of catalyst beds are installed.

It may be necessary to insert quench boxes (in the English sense of "quenching a reaction") in the recycle system or between reactors, so as to cool the effluents from one
35 reactor to another or from one catalyst bed to another, in order to control the temperatures and

the hydrothermal equilibrium of each reaction. According to a preferred embodiment, there are no cooling or quenching intermediates.

According to one embodiment, the product coming from hydrogenation step b) and/or the separated gases are at least partially recycled to the feeding system of the hydrogenation reactors. Such dilution contributes to keeping the exothermicity of the reaction within controlled limits, more particularly at the first stage. Furthermore, recycling makes heat exchange possible before the reaction and also better temperature control.

According to one embodiment, the method of the invention further comprises a recycling of part of the hydrogenated hydrocarbon feedstock obtained at the end of the hydrogenation step b) in order to be mixed with the hydrocarbon feedstock provided during step a) upstream of the hydrogenation step b).

"Part of the hydrogenated hydrocarbon feedstock", as defined by the present invention, should be understood as a proportion of the volume of hydrogenated hydrocarbon feedstock, and it will not be a question of carrying out a separation or a specific treatment during such recycle.

Preferably, the mixture of the hydrogenated feedstock and of the non-hydrogenated feedstock defined in the invention (step a) is carried out with a hydrocarbon feedstock weight ratio provided during step a) hydrogenated hydrocarbon feedstock obtained at the end of step b) ranging from 50/50 to 90/10, preferably from 50/50 to 80/20.

The effluent from the hydrogenation unit contains mainly the hydrogenated product and hydrogen. Flash separators are used to separate effluents in the gas phase, mainly residual hydrogen, and in the liquid phase, mainly hydrogenated hydrocarbon cuts. The method can be carried out using three flash separators, one at high pressure, one at intermediate pressure and one at low pressure very close to atmospheric pressure.

The gaseous hydrogen collected at the top of the flash separators can be recycled in the feeding system of the hydrogenation unit or at different levels in the hydrogenation units between the reactors.

Advantageously, the hydrogenation step is carried out until a hydrogenated hydrocarbon feedstock with a very low aromatic content is obtained, preferably less than 500 ppm by weight, preferably less than 300 ppm by weight and more preferentially less than 100 ppm by weight.

The hydrogenated hydrocarbon feedstock has a content of aromatics which is lower than the content of aromatics of the feedstock before step a). Advantageously, the hydrogenation is carried out under the conditions mentioned above until a degree of

conversion of the aromatic compounds of between 95 and 100%, preferably between 98 and 99.99%, is obtained.

Hydrogenation converts aromatic compounds into naphthenic compounds.

5 The hydrogenation step can be followed by a measurement of the content of aromatics by UV spectrometry or by high performance liquid chromatography (HPLC). HPLC is preferably used when the quantity of aromatics is greater than 0.1% by weight, but the samples can also be diluted in order to be able to measure the content of aromatics by UV spectrometry when the content of aromatics of the samples is too high.

10 Hydrogenated hydrocarbon feedstock

The hydrogenated hydrocarbon feedstock preferably comprises:

- a) less than 500 ppm by weight, preferably less than 300 ppm by weight and more preferentially less than 100 ppm by weight;
 - b) from 20 to 60 % by weight of paraffins;
 - 15 c) from 40 to 80 % by weight of naphthenes,
- relative to the total weight of the hydrogenated hydrocarbon feedstock.

The hydrogenated hydrocarbon feedstock has substantially the same initial boiling point and the same final boiling point as the hydrocarbon feedstock (before hydrogenation).

20 "Substantially the same boiling point" should be understood as a boiling point equal to or which is different only by a temperature of 10°C or less.

Thereby, the hydrogenated hydrocarbon feedstock has a boiling range having an extent greater than or equal to 100°C, preferably greater than or equal to 120°C, else more preferably greater than or equal to 150°C.

According to one embodiment, the initial boiling point of the hydrogenated hydrocarbon feedstock lies in the range from 20 to 250°C, preferably from 30 to 200°C.

According to one embodiment, the final boiling point of the hydrogenated hydrocarbon feedstock lies in the range from 150 to 400°C, preferably from 180 to 390°C.

30 Thereby, if the hydrocarbon feedstock to be hydrogenated is a gasoline cut, the hydrogenated hydrocarbon feedstock will also be a gasoline cut.

Distillation of the hydrogenated hydrocarbon feedstock

35 The method of the invention comprises at least one step of distillation of a hydrocarbon feedstock, said hydrocarbon feedstock having optionally been hydrogenated according to the hydrogenation method described in the invention.

According to one embodiment, the distillation step is carried out at a temperature ranging from 60 to 180°C and at a pressure ranging from 50 to 1000 mbar.

Preferably, the distillation step is carried out in order to obtain, at the end of the distillation, one or a plurality of hydrocarbon cuts each having a boiling range narrower than the boiling range of the hydrocarbon feedstock at the inlet of the distillation.

According to one embodiment, the extent of the boiling range of the hydrocarbon cuts at the end of the distillation is less than or equal to 100°C, preferably less than or equal to 80°C, or more preferably less than or equal to 70°C. According to one embodiment, the extent of the boiling range of the hydrocarbon cuts resulting from the distillation ranges from 10 to 100°C, preferably from 15 to 80°C, else more preferably from 20 to 70°C.

According to one embodiment, at least two hydrocarbon cuts or even at least three hydrocarbon cuts are obtained at the end of the distillation according to the invention, the hydrocarbon cuts having different boiling ranges, where the extent of the boiling ranges may be identical or different between the different cuts.

According to one embodiment, the distillation is carried out in such a way that it is possible to simultaneously remove various hydrocarbon cuts from the distillation column and to be able to predetermine the boiling temperature thereof.

Depending on the embodiment where the hydrocarbon feedstock is hydrogenated, by adapting the feedstock through the initial and final boiling points thereof, the hydrogenation reactors, separators and distillation unit can thus be directly connected without the need for intermediate tanks. Such integration of the hydrogenation and the distillation leads to an optimized thermal integration combined with a reduction in the number of devices and with energy saving.

According to one embodiment, the distillation step is carried out on a hydrocarbon feedstock of gasoline type defined in the invention, without a hydrogenation step. According to such embodiment, preferably, the distillation according to the invention serves to obtain at least two hydrocarbon cuts:

- (i) a CA1 cut having an initial boiling point and a final boiling point in the range going from 150 to 190°C, preferably from 155 to 185°C, said CA1 cut having a boiling range extent preferably going from 10 to 30°C, preferably from 15 to 25°C;
- (ii) a CA2 cut having an initial boiling point and a final boiling point in the range going from 185 to 250°C, preferably from 190 to 240°C, said CA2 cut having a boiling range extent preferably going from 20 to 70°C, preferably from 30 to 50°C.

According to one embodiment, the distillation step is carried out on a hydrocarbon feedstock of gasoline type defined in the invention, after a hydrogenation step. According to such embodiment, preferably, the distillation according to the invention serves to obtain at least three hydrocarbon cuts:

- 5 (i) a CN1 cut having an initial boiling point and a final boiling point in the range going from 30 to 100°C, preferably from 40 to 90°C, said CN1 cut having a boiling range extent preferably going from 10 to 50°C, preferably from 20 to 40°C;
- (ii) a CN2 cut having an initial boiling point and a final boiling point in the range of from 90 to 165°C, preferably from 95 to 160°C, said CN2 cut having a boiling range extent preferably from 10 30 to 70°C, preferably ranging from 40 to 60°C.;
- (ii) a CN3 cut having an initial boiling point and a final boiling point in the range going from 160 to 250°C, preferably from 165 to 230°C, said CN3 cut having a boiling range extent preferably going from 30 to 70°C, preferably from 40 to 60°C.

- 15 According to one embodiment, the method according to the invention comprises:
- a) providing a hydrocarbon feedstock originating from ethanol having an initial boiling point and a final boiling point in the range from 20 to 250°C and comprising:
 - from 20 to 60 % by weight of aromatic compounds;
 - from 20 to 60 % by weight of non-cyclic paraffins; and
 - 20 - from 2 to 20 % by weight of naphthenes,
 with respect to the total weight of the hydrocarbon feedstock, the weight ratio between the quantity of iso-paraffins and the quantity of n-paraffins being greater than or equal to 3,
 - b) optionally, a step of hydrogenation of the hydrocarbon feedstock originating from ethanol 25 provided during step a) in order to obtain a hydrogenated hydrocarbon feedstock;
 - c) a distillation step (i) of the hydrocarbon feedstock originating from ethanol during step a) or (ii) of the hydrogenated hydrocarbon feedstock according to step b), in order to obtain at least one hydrocarbon cut having a difference of less than 100°C between the final boiling point thereof and the initial boiling point thereof.

- 30 According to one embodiment, the method according to the invention comprises:
- a) providing a hydrocarbon feedstock originating from ethanol having an initial boiling point and an final boiling point in the range from 20 to 250°C and comprising:
 - from 20 to 60 % by weight of aromatic compounds;
 - 35 - from 5 to 10 % by weight of n-paraffins;
 - from 20 to 45 % by weight of iso-paraffins; and

- from 2 to 20 % by weight of naphthenes,

with respect of the total weight of the hydrocarbon feedstock,

b) optionally, a step of hydrogenation of the hydrocarbon feedstock originating from ethanol provided during step a) in order to obtain a hydrogenated hydrocarbon feedstock;

5 c) a distillation step (i) of the hydrocarbon feedstock originating from ethanol during step a) or (ii) of the hydrogenated hydrocarbon feedstock according to step b), in order to obtain at least one hydrocarbon cut having a difference of less than 100°C between the final boiling point thereof and the initial boiling point thereof.

10 According to one embodiment, the method according to the invention comprises:

a) providing a hydrocarbon feedstock originating from ethanol having an initial boiling point and an final boiling point in the range from 20 to 250°C and comprising:

- from 20 to 60 % by weight of aromatic compounds;

- from 20 to 60 % by weight of non-cyclic paraffins; and

15 - from 2 to 20 % by weight of naphthenes,

with respect o the total weight of the hydrocarbon feedstock,

the weight ratio between the quantity of iso-paraffins and the quantity of n-paraffins being greater than or equal to 3,

the hydrocarbon feedstock having a biocarbon content of at least 90% by weight, with respect

20 to the total carbon weight of the hydrocarbon feedstock,

b) optionally, a step of hydrogenation of the hydrocarbon feedstock originating from ethanol provided during step a) in order to obtain a hydrogenated hydrocarbon feedstock;

c) a distillation step (i) of the hydrocarbon feedstock originating from ethanol during step a) or (ii) of the hydrogenated hydrocarbon feedstock according to step b), in order to obtain at least

25 one hydrocarbon cut having a difference of less than 100°C between the final boiling point thereof and the initial boiling point thereof.

30 Solvent or hydrocarbon cut

The present invention further relates to a hydrocarbon solvent or cut as such and to a hydrocarbon solvent or cut which can be obtained according to the method of the invention.

The solvent, also called a hydrocarbon cut, according to the invention typically has a biocarbon content of at least 90% by weight, relative to the total carbon weight of the solvent.

35 The term "bio-carbon" indicates that carbon has a naturally origin and comes from a biomaterial. The content of bio-carbon and the content of biomaterial are expressions

indicating the same value. A renewable material or biomaterial is an organic material wherein carbon comes from CO₂ recently fixed (on a human scale) by photosynthesis from the atmosphere. A biomaterial (100% carbon of natural origin) has an isotopic ratio of ¹⁴C /¹²C greater than 10⁻¹², typically about 1.2 x 10⁻¹², while a fossil material has a ratio equal to zero.

5 Indeed, the isotopic ¹⁴C formed in the atmosphere is then integrated by photosynthesis, according to a time scale of at most a few decades. The half-life of ¹⁴C is 5730 years. Thereby, the materials resulting from photosynthesis, namely plants in general, necessarily have a maximum content of isotope ¹⁴C.

10 The determination of the content of biomaterial or of bio-carbon is given according to ASTM D 6866, the sample being prepared for such test according to the standard ASTM D7026. The solvent according to the invention has a biomaterial content of at least 90% by weight relative to the weight of the solvent. The content is advantageously higher, more particularly greater than or equal to 95%, preferably greater than or equal to 98% and advantageously equal to 100%.

15 In addition to a particularly high content of biomaterial, the solvent according to the invention has a particularly good biodegradability. Biodegradation of an organic chemical refers to the reduction of the complexity of chemical compounds through the metabolic activity of microorganisms. Under aerobic conditions, microorganisms convert organic substances into carbon dioxide, water and biomass. The OECD 306 method is used for the assessment of the
20 biodegradability of individual substances in seawater. According to said method, the solvent according to the invention preferably has a biodegradability, at 28 days, of at least 60%, preferably of at least 70%, more preferably of at least 75% and advantageously of at least 80%.

25 The hydrocarbon cut according to the invention comprises:

a) a biocarbon content greater than or equal to 90% by weight, preferably greater than or equal to 95% by weight, relative to the total carbon weight of the hydrocarbon cut

b) a content of naphthenes and of aromatics chosen from:

30 b1) a naphthene content ranging from 2 to 20% by weight and a content of aromatics ranging from 30 to 60% by weight, with respect to the total weight of the hydrocarbon cut or

b2) a naphthene content of 40 to 80% by weight and a content of aromatics of 500 ppm by weight or less, with respect to the total weight of the hydrocarbon cut,

c) a content of non-cyclic paraffins ranging from 20 to 60% by weight.

35

According to one embodiment, the extent of the boiling range of the hydrocarbon cuts according to the invention is less than or equal to 100°C, preferably less than or equal to 80°C, else more preferably less than or equal to 70°C. According to one embodiment, the extent of the boiling range of the hydrocarbon cuts according to the invention ranges from 10 to 100°C, preferably from 15 to 80°C, else preferably from 20 to 70°C.

According to one embodiment, the solvent according to the invention is chosen from a CA1 cut, a CA2 cut, a CN1 cut, a CN2 cut, a CN3 cut and a combination of one or more of the cuts:

(i) a CA1 cut having an initial boiling point and a final boiling point in the range going from 150 to 190°C, preferably from 155 to 185°C, said CA1 cut having a boiling range extent preferably going from 10 to 30°C, preferably from 15 to 25°C;

(ii) a CA2 cut having an initial boiling point and a final boiling point in the range of from 185 to 250°C, preferably from 190 to 240°C, said CA2 cut having a boiling range extent preferably from 20 to 70°C, preferably ranging from 30 to 50°C.;

(iii) a CN1 cut having an initial boiling point and a final boiling point in the range going from 30 to 100°C, preferably from 40 to 90°C, said CN1 cut having a boiling range extent preferably going from 10 to 50°C, preferably from 20 to 40°C;

(iv) a CN2 cut having an initial boiling point and a final boiling point in the range of from 90 to 165°C, preferably from 95 to 160°C, said CN2 cut having a boiling range extent preferably from 30 to 70°C, preferably ranging from 40 to 60°C.;

(v) a CN3 cut having an initial boiling point and a final boiling point in the range going from 160 to 250°C, preferably from 165 to 230°C, said CN3 cut having a boiling range extent preferably going from 30 to 70°C, preferably from 40 to 60°C.

According to one embodiment, the solvent according to the invention is chosen from an aromatic cut and a naphthenic cut.

Preferably, the naphthenic cut has a content of aromatics of less than or equal to 500 ppm, preferably less than or equal to 300 ppm, preferably less than or equal to 100 ppm by weight, relative to the total weight of the naphthenic cut.

Preferably, the aromatic cut has a content of aromatics ranging from 30 to 60% by weight, preferably from 35 to 55% by weight, relative to the total weight of the aromatic cut.

According to one embodiment, the solvent according to the invention comprises:

- a) from 30 to 60% by weight, preferably from 35 to 55% by weight, of aromatic compounds;
- b) from 20 to 60% by weight, preferably from 30 to 50% by weight, of non-cyclic paraffins; and

c) from 2 to 20% by weight, preferably from 5 to 15% by weight, of naphthenes, with respect to the total weight of the solvent.

According to a particular embodiment, the solvent according to the invention comprises:

- 5 a) less than 300 ppm by weight, preferably less than 100 ppm by weight, of aromatic compounds;
 b) from 20 to 60% by weight, preferably from 30 to 50% by weight, of non-cyclic paraffins; and
 c) from 40 to 80% by weight, preferably from 5 to 15% by weight, of naphthenes, with respect to the total weight of the solvent.

10

According to a particular embodiment, the solvent according to the invention has an initial boiling point and a final boiling point in the range going from 100 to 250°C and a boiling range extent of less than 100°C, preferably less than 80°C, and the solvent comprises:

- a) from 30 to 60% by weight, preferably from 35 to 55% by weight, of aromatic compounds;
 15 b) from 20 to 60% by weight, preferably from 30 to 50% by weight, of non-cyclic paraffins; and
 c) from 2 to 20% by weight, preferably from 5 to 15% by weight, of naphthenes, with respect to the total weight of the solvent.

According to another particular embodiment, the solvent according to the invention has

20 an initial boiling point and a final boiling point in the range going from 30 to 240°C and a boiling range extent of less than 100°C, preferably less than 80°C, and the solvent comprises:

- a) less than 300 ppm by weight, preferably less than 100 ppm by weight, of aromatic compounds;
 b) from 20 to 60% by weight, preferably from 30 to 50% by weight, of non-cyclic paraffins; and
 25 c) from 40 to 80% by weight, preferably from 5 to 15% by weight, of naphthenes, with respect to the total weight of the solvent.

According to one embodiment, the solvent according to the invention is chosen from a CA1 cut, a CA2 cut, a CN1 cut, a CN2 cut, a CN3 cut and a combination of one or more of the
 30 cuts:

- (i) a CA1 cut having an initial boiling point and a final boiling point in the range going from 150 to 190°C, preferably from 155 to 185°C, said CA1 cut having a boiling range extent preferably going from 10 to 30°C, preferably from 15 to 25°C, said CA1 cut having an aromatic content ranging from 30 to 60% by weight, preferably from 35 to 55% by weight, relative to the total
 35 weight of the CA1 cut;

- (ii) a CA2 cut having an initial boiling point and a final boiling point in the range going from 185 to 250°C, preferably from 190 to 240°C, said CA2 cut having a boiling range extent preferably going from 20 to 70°C, preferably from 30 to 50°C, said CA2 cut having an aromatic content going from 30 to 60% by weight, preferably from 35 to 55% by weight, relative to the total weight of the CA2 cut;
- (iii) a CN1 cut having an initial boiling point and a final boiling point in the range going from 30 to 100°C, preferably from 40 to 90°C, said CN1 cut having a boiling range extent preferably going from 10 to 50°C, preferably from 20 to 40°C, said CN1 cut having an aromatic content of less than or equal to 500 ppm, preferably less than or equal to 300 ppm, preferably less than or equal to 100 ppm by weight, relative to the total weight of the CN1 cut;
- (iv) a CN2 cut having an initial boiling point and a final boiling point in the range going from 90 to 165°C, preferably from 95 to 160°C, said CN2 cut having a boiling range extent preferably from 30 to 70°C, preferably ranging from 40 to 60°C, said CN2 cut having an aromatic content of less than or equal to 500 ppm, preferably less than or equal to 300 ppm, preferably less than or equal to 100 ppm by weight, relative to the total weight of the CN2 cut;
- (v) a CN3 cut having an initial boiling point and a final boiling point in the range going from 160 to 250°C, preferably from 165 to 230°C, said CN3 cut having a boiling range extent preferably from 30 to 70°C, preferably ranging from 40 to 60°C, said CN3 cut having an aromatic content of less than or equal to 500 ppm, preferably less than or equal to 300 ppm, preferably less than or equal to 100 ppm by weight, relative to the total weight of the CN3 cut;

According to one embodiment, the solvent according to the invention has a pour point of less than or equal to -80°C, preferably less than or equal to -100°C, else preferably less than or equal to -110°C. The pour point can be measured according to the standard ASTM D97.

Use of the hydrocarbon cut:

A further subject matter of the invention relates to the use of the hydrocarbon cut according to the invention, as a solvent or as a thermal fluid or as an additive in the fuel formulation, for example as a solvent for the chemical industry, as an extraction solvent, as a solvent in an ink formulation, in an adhesive formulation, in a composition of a paint, of a material (for example wood) coating, of a material (for example wood) treatment, of a putty, of polymerization, of aerosol, of cleaning or of water treatment.

The hydrocarbon cuts according to the invention can be used: as drilling fluids, in hydraulic fracturing, in mining, in water treatment, as industrial solvents, in the composition of

paints, for decorative coatings, in coating fluids, in the automotive industry, in the textile industry, in metal extraction, in explosives, in oil dispersants, in the formulations for concrete mold release, in adhesives, in printing inks, in metalworking fluids, in coating fluids, in rolling oils, in particular for aluminum, as cutting fluids, as rolling oils, as fluids for electrical discharge machining (EDM)s, as anti-rust agents, as industrial lubricants, as extender oils, in sealants such as putties or polymers, in particular containing silicone, as viscosity depressants in plasticized polyvinyl chloride formulations, in resins, in varnishes, in polymers used in water treatment, paper making or printing pastes, in particular as thickener, cleaning and/or degreasing solvents, for suspension polymerization, in the food processing industry, for food grade applications, home care, heat-transfer media, shock absorbers, insulating oils, hydraulic oils, gear oils, turbine oils, textile oils and transmission fluids such as automatic transmission fluids or formulations for manual gearboxes, and as solvents in chemical reactions, including crystallization, extraction and fermentation, as dielectric fluid or cooling fluid.

15 **EXAMPLES**

In the remainder of the present description, examples are given by way of illustration of the present invention and under no circumstances are intended to limit its scope.

Example 1: description of the hydrocarbon feedstock

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Table 1 shows the physical and chemical properties of the hydrocarbon feedstock.

The hydrocarbon feedstock was obtained by catalytic treatment from ethanol, a first step of conversion of ethanol into ethylene and a second stage of oligomerization of ethylene. Distillation was carried out to remove the gas and the very heavy black background at the end of oligomerization, and to obtain a gasoline feedstock.

25

[Table 1]

Characteristics	Hydrocarbon feedstock
Aromatics (% by weight)	49.53
Oxygen content (% by weight)	<0.1
% iso paraffins (% by weight)	28.41
% n-paraffins (% by weight)	8.97
% naphthenes (% by weight)	11.32
% olefins (% by weight)	1.83
C4 (% by weight)	2.84
C5 (% by weight)	10.82
C6 (% by weight)	12.35
C7 (% by weight)	13.57
C8 (% by weight)	18.52
C9 (% by weight)	23.72
C10 (% by weight)	12.39
C11 (% by weight)	5.72
Quantity of carbon of biological origin (%)	100
Initial boiling point IBP (°C)	35.3
Final boiling point FBP (°C)	201.1
OECD biodegradability (28 days) (%)	>60%
Density at 15°C (kg/m ³)	769.7
Volume evaporated at 70°C (% vol)	17.1
Volume evaporated at 100°C (% vol)	34.4
Volume evaporated at 150°C (% vol)	66.3

The following standards and methods were used to measure the above properties:

- density at 15°C: EN ISO 1185;
- Boiling point: ASTM D86;
- biodegradability: OECD 306 method;

- carbon of biological origin: the standard ASTM D 6866, the sample being prepared for the test according to the standard ASTM D7026;

- isoparaffins, naphthenes, n-paraffins, olefins, aromatics, oxygen content, distribution of hydrocarbon compounds: NF EN ISO 22854;

5 - Evaporated volume: ASTM D7345

Example 2: hydrogenation

The hydrocarbon feedstock in Table 1 was hydrogenated under the following conditions:

- temperature: 100°C

10 - pressure: 50 bar

- stoichiometric excess between 2 and 3

- VVH: 1.0 h⁻¹

The hydrogenation is continued until a desired aromatic content is obtained. The aromatic
15 content can be measured by UV spectrometry.

Within the framework of the present example, the hydrogenated hydrocarbon feedstock has an aromatic content of less than 50 ppm by weight.

20 Example 3: Distillation according to the invention

A distillation step is carried out under the following conditions:

- pressure: 100 mmHg

- Watson characterization factor (KW): Kw=12

25 (i) on the hydrocarbon feedstock of table 1, and

(ii) on the hydrogenated hydrocarbon feedstock obtained at the end of example 2.

The hydrocarbon cuts described in Table 2 are then obtained. The cuts Ex. CA1 and Ex. CA2 are cuts obtained directly by distillation of the hydrocarbon feedstock of Table 1 and the cuts

30 Ex. CN1, Ex. CN2 and ex. CN3 are cuts obtained by distillation after the hydrogenation step.

[Table 2]

	Ex. CA1	Ex. CA2	Ex. CN1	Ex. CN2	Ex. CN3
IBP (°C)	162	195.4	48.4	100.6	167
FBP (°C)	182.4	237.8	84.9	152	219.9
aromatics by UV (ppm)	-	-	6	11	44
aromatics by GC (% by weight)	87%	95%	-	-	-
Kinematic viscosity at 40°C (cSt)	0.773	1.122	0.423	0.732	1.132
Pour point (°C)	< -110	-110		-114	-113
Density at 15°C (kg/m ³)	865.2	886.5	669.8	766.6	812.4
Aniline point (°C)				53.3	57.5
Benzene content (ppm)	< 1	< 1	< 1	< 1	< 1
Water content (ppm)	175	91	60	43	19

The following methods and standards are used:

- IBP and FBP boiling point: ASTM D86
- 5 - Kinematic viscosity at 40°C: ASTM D445
- pour point: ASTM D97
- Density at 15°C: ASTM D4052
- aniline point: ASTM D611
- benzene content ASTM D6229
- 10 - Water content: ASTM D6304

Ex cuts Ex. CA1 and Ex. CA2 are aromatic cuts and the cuts Ex. CN1, Ex. CN2 and Ex. CN3 are naphthenic cuts.

- 15 The characteristics of Table 2 show that the hydrocarbon cuts according to the invention have properties which make same suitable for use as solvent.

The present invention thus makes it possible to obtain an aromatic or naphthenic solvent from a biomaterial, such as bioethanol.

Example 4: Acrylic paint formulation

In the present example, a hydrocarbon fluid of fossil origin HCF (having a biocarbon content of less than 90% by weight of the total weight of carbon atoms and a biodegradability at 28 days of less than 60% according to the standard OECD 301B) was compared with the fluid of the invention. The fluid has the characteristics described in Table 3 hereinbelow.

[Table 3]

	HCF
Density at 15°C ASTM D4052	790 kg/m ³
ASTM D86 distillation (IBP-FBP)	159-201°C
Viscosity at 40°C ASTM D445	1.00 mm ² /sec
Aromatics content (UV method)	< 50 ppm

The HCF fluid was compared to the fluid of the invention Ex. CN3 for use as a solvent in an acrylic paint formulation the formula of which is described in Table 4.

[Table 4]

Role	Nature	Quantity (% by weight)
Binder	Polymethacrylate	35.28
Dispersant	Polyester phosphoric acid	0.54
Feedstock	Calcium carbonate	25.0
Pigment	Titanium dioxide	18.1
Surfactant	Silicone polyester	0.18
Wetting agent	Siloxane polyethers	0.50
Solvent	HCF or Ex. CN3	20.4

Two paint formulations were prepared and assessed: Formulation PC1 with the HCF solvent of the prior art and formulation PI1 with the solvent Ex. CN3 of the invention.

The assessments consist of a measurement of the drying time, an assessment of the appearance of the film and an assessment of the stability.

5 Test drying time:

The test samples are applied onto contrast maps. The thickness of wet paint applied, using a hand coater, is 300 µm. Drying takes place in the open air, in a hood, in a laboratory at 23 °C.

Film appearance:

- 10 Gloss and opacity measurements are made on dry film. 300 µm of wet paint are applied via hand coater onto a contrast card, then allowed to dry in the open air for 4 hours. Measurements are taken using a gloss-meter and a colorimeter. The results are given at an angle of 60°.

Stability:

- 15 The viscosity of the paints is measured on the day of the manufacture thereof, at 24°C and a relative humidity of 60%. Same are then placed at rest in a laboratory at 20°C. One month later, the viscosities thereof are measured at a temperature of 22°C and a relative humidity of 60%.

- 20 The results of the assessments are shown in Table 5.

[Table 5]

	PC1	PI1
Drying time	30 minutes	26 minutes
Gloss	12 UB	11.7 UB
Stability of the formula – increase in viscosity	+28%	+11%

The results of Table 5 show that the fluid of the invention (Ex. CN3) leads to a shorter drying time and better stability of the formula than the solvent of the prior art (HCF) with a similar boiling range.

Example 5: Alkyd paint formulation

The HCF fluid described in example 4 was compared with the fluid of the invention Ex. CN3 for use as a solvent in an alkyd paint formulation the formula of which is described in Table 6.

5

[Table 6]

Role	Nature	Quantity (% by weight)
Binder	Alkyd	44.32
Dispersant	Phosphoric ester salt	1.62
Feedstock	Calcium carbonate + calcite	6.69 + 6.69
Pigment	Titanium dioxide	27.17
Desiccant agent	Containing metals	2.48
Anti-skinning agent	Cyclohexanone-oxime	0.28
Rheological agent	Urea modified in DMSO	0.70
Solvent	HCF or Ex. CN3	10.05

Two paint formulations were prepared and assessed: Formulation PC2 with the HCF solvent of the prior art and formulation PI2 with the solvent Ex. CN3 of the invention.

10

The assessments consist of a measurement of the drying time, an assessment of the appearance of the film and an assessment of the stability, according to the protocols described in example 4.

15 The results of the assessments are shown in Table 7.

[Table 7]

	PC2	PI2
Drying time	5h45	4h30
Gloss	74 UB	75 UB
Stability of the formula – increase in viscosity	+33%	+33%

The results of Table 7 show that the fluid of the invention (Ex. CN3) leads to a shorter drying time than the solvent of the prior art (HCF) with a similar boiling range.

CLAIMS

1. A method for the preparation of hydrocarbon cuts, said method comprising:
 - a) providing a hydrocarbon feedstock originating from ethanol comprising:

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 - from 20 to 60 % by weight of aromatic compounds;
 - from 20 to 60 % by weight of non-cyclic paraffins; and
 - from 2 to 20 % by weight of naphthenes,

with respect to the total weight of the hydrocarbon feedstock,

 - b) optionally, a step of hydrogenation of the hydrocarbon feedstock originating from ethanol provided during step a) in order to obtain a hydrogenated hydrocarbon feedstock;

10

 - c) a distillation step (i) of the hydrocarbon feedstock originating from ethanol during step a) or (ii) of the hydrogenated hydrocarbon feedstock according to step b), in order to obtain at least one hydrocarbon cut having a difference of less than 100°C between the final boiling point thereof and the initial boiling point thereof,

15

the hydrocarbon feedstock of step a) having an initial boiling point and a final boiling point in the range going from 20 to 250°C.
2. The method according to claim 1, wherein step a) comprises a preparation step for preparing the hydrocarbon feedstock, said preparation step preferably comprising a conversion step for converting ethanol into ethylene and an oligomerization step for oligomerizing ethylene, the ethanol preferably being bioethanol

20
3. The method according to any of claims 1 to 2, wherein the hydrocarbon feedstock of step a) has one or a plurality of the following features:

25

 - a content of aromatic compounds ranging from 30 to 60% by weight, preferably from 35 to 55% by weight, with respect to the total weight of the hydrocarbon feedstock, and/or
 - a content of non-paraffins ranging from 20 to 60% by weight, preferably from 30 to 40% by weight, with respect to the total weight of the hydrocarbon feedstock, and/or

30
 - a naphthene content ranging from 2 to 20% by weight, preferably from 5 to 15% by weight, with respect to the total weight of the hydrocarbon feedstock, and/or
 - an initial boiling point in the range going from 20 to 250°C, preferably from 30 to 200°C, and/or

35

- a final boiling point in the range going from 150 to 400°C, preferably from 180 to 390°C, and/or
- a boiling range having an extent greater than or equal to 100°C, preferably greater than or equal to 120°C, more preferably greater than or equal to 150°C.

5

4. The method according to any of claims 1 to 3, wherein the hydrocarbon feedstock of step a) has an initial boiling point and a final boiling point in the range going from 30 to 230°C and has a difference greater than or equal to 150°C between the final boiling point thereof and the initial boiling point thereof.

10

5. The method according to any of claims 1 to 4, wherein the hydrocarbon feedstock of step a) has a biocarbon content greater than or equal to 90% by weight, preferably greater than or equal to 95% by weight, with respect to the total carbon weight of the hydrocarbon feedstock.

15

6. The method according to any of claims 1 to 5, wherein the hydrogenation step b) is present and wherein it is carried out at a temperature ranging from 60 to 180°C and a pressure ranging from 20 to 160 bar.

20

7. The method according to claim 6, comprising a recycling of part of the hydrogenated hydrocarbon feedstock obtained at the end of the hydrogenation step b) in order to be mixed with the hydrocarbon feedstock provided in step a), preferably the mixture being carried out with a ratio hydrocarbon feedstock weight provided during step a)/hydrogenated hydrocarbon feedstock obtained at the end of step b), ranging from 50/50 to 90/10.

25

8. The method according to claim 6 or 7, wherein the hydrogenated hydrocarbon feedstock obtained at the end of the hydrogenation step comprises less than 500 ppm by weight of aromatics, preferably less than 300 ppm by weight of aromatics, more preferably less than 100 ppm by weight of aromatics, relative to the total weight of the hydrogenated hydrocarbon feedstock.

30

9. The method according to one of claims 6 to 8, wherein at least two hydrocarbon cuts are prepared, preferably said hydrocarbon cuts are:

(i) a CA1 cut having an initial boiling point and a final boiling point in the range going from 150 to 190°C, preferably from 155 to 185°C, said CA1 cut having a boiling range extent preferably going from 10 to 30°C, preferably from 15 to 25°C;

(ii) a CA2 cut having an initial boiling point and a final boiling point in the range going from 185 to 250°C, preferably from 190 to 240°C, said CA2 cut having a boiling range extent preferably going from 20 to 70°C, preferably from 30 to 50°C.

10. The method according to any of claims 1 to 5, wherein the distillation step is carried out directly on the hydrocarbon feedstock, without hydrogenation, and wherein at least two hydrocarbon cuts are prepared, preferably at least three hydrocarbon cuts are prepared, more preferably said cuts are:

(i) a CN1 cut having an initial boiling point and a final boiling point in the range going from 30 to 100°C, preferably from 40 to 90°C, said CN1 cut having a boiling range extent preferably going from 10 to 50°C, preferably from 20 to 40°C;

(ii) a CN2 cut having an initial boiling point and a final boiling point in the range going from 90 to 165°C, preferably from 95 to 160°C, said CN2 cut having a boiling range extent preferably going from 30 to 70°C, preferably from 40 to 60°C.

(ii) a CN3 cut having an initial boiling point and a final boiling point in the range going from 160 to 250°C, preferably from 165 to 230°C, said CN3 cut having a boiling range extent preferably going from 30 to 70°C, preferably from 40 to 60°C.

11. A hydrocarbon cut having a difference of less than 100°C between the final boiling point and the initial boiling point, said hydrocarbon cut comprising:

a) a biocarbon content greater than or equal to 90% by weight, preferably greater than or equal to 95% by weight, with respect to the total weight of carbon atoms,

b) a naphthenes and aromatics content selected from:

b1) a naphthene content ranging from 2 to 20% by weight and a content of aromatics ranging from 30 to 60% by weight, with respect to the total weight of the hydrocarbon cut or

b2) a naphthene content of 40 to 80% by weight and a content of aromatics of 500 ppm by weight or less, with respect to the total weight of the hydrocarbon cut,

c) a content of non-cyclic paraffins ranging from 20 to 60% by weight.

12. The hydrocarbon cut according to claim 11, chosen from the following cuts:

(i) a CA1 cut having an initial boiling point and a final boiling point in the range going from 150 to 190°C, preferably from 155 to 185°C, said CA1 cut having a boiling range

extent preferably going from 10 to 30°C, preferably from 15 to 25°C, said CA1 cut having an aromatic content ranging from 30 to 60% by weight, preferably from 35 to 55% by weight, relative to the total weight of the CA1 cut;

(ii) a CA2 cut having an initial boiling point and a final boiling point in the range going from 185 to 250°C, preferably from 190 to 240°C, said CA2 cut having a boiling range extent preferably going from 20 to 70°C, preferably from 30 to 50°C, said CA2 cut having an aromatic content going from 30 to 60% by weight, preferably from 35 to 55% by weight, relative to the total weight of the CA2 cut;

(iii) a CN1 cut having an initial boiling point and a final boiling point in the range going from 30 to 100°C, preferably from 40 to 90°C, said CN1 cut having a boiling range extent preferably going from 10 to 50°C, preferably from 20 to 40°C, said CN1 cut having an aromatic content of less than or equal to 500 ppm, preferably less than or equal to 300 ppm, preferably less than or equal to 100 ppm by weight, relative to the total weight of the CN1 cut;

(iv) a CN2 cut having an initial boiling point and a final boiling point in the range going from 90 to 165°C, preferably from 95 to 160°C, said CN2 cut having a boiling range extent preferably from 30 to 70°C, preferably ranging from 40 to 60°C, said CN2 cut having an aromatic content of less than or equal to 500 ppm, preferably less than or equal to 300 ppm, preferably less than or equal to 100 ppm by weight, relative to the total weight of the CN2 cut;

(v) a CN3 cut having an initial boiling point and a final boiling point in the range going from 160 to 250°C, preferably from 165 to 230°C, said CN3 cut having a boiling range extent preferably from 30 to 70°C, preferably going from 40 to 60°C, said CN3 cut having an aromatic content of less than or equal to 500 ppm, preferably less than or equal to 300 ppm.

13. A hydrocarbon cut according to claim 11 or 12, which can be obtained by a method according to any of claims 1 to 10.

14. A use of a hydrocarbon cut according to any of claims 11 to 13, as a solvent or as a thermal fluid or as an additive in the fuel formulation, for example as a solvent for the chemical industry, as an extraction solvent, as a solvent in an ink formulation, in an adhesive formulation, in a composition of a paint, of a material coating, of a material treatment, of a putty, of polymerization, of aerosol, of cleaning or of water treatment.