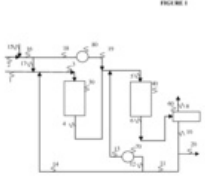
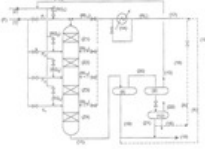
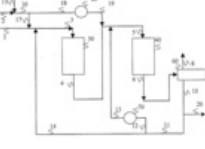
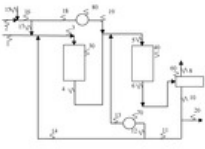
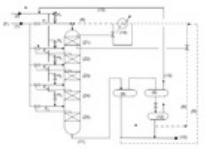
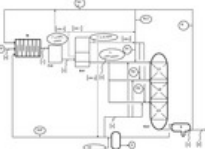
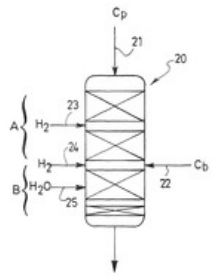
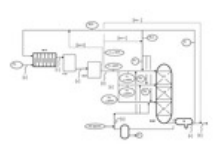
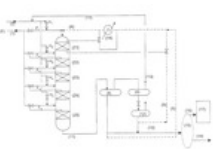
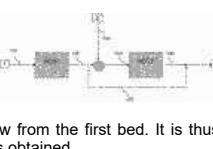
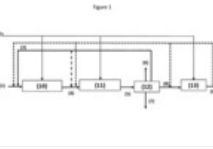
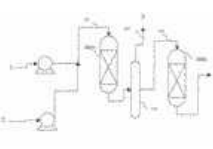
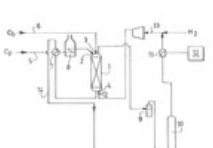


#	 Title	Publication number	Publ. date	Applicant/Assignee		
1.	Process for hydrotreating renewable sources with indirect heating implementing a molybdenum catalyst	US20110094149	2011-04-28	IFP ENERGIES NOUVELLES*		
Treating charges obtained from renewable sources comprises: (a) hydrotreating comprising at least two catalytic areas in which the incoming stream comprises the charge mixed with at least a part of a hydrotreated liquid effluent obtained from step (b) and a hydrogen-rich gas is introduced into the first catalytic area at a temperature of 150-260[deg] C; and (b) separating the effluent obtained from the step (a) of hydrotreatment allowing the separation of a gaseous effluent and a hydrotreated liquid effluent of which at least a part is recycled at the top of each catalytic area of step (a). Treating charges obtained from renewable sources comprises: (a) hydrotreating comprising at least two catalytic areas in which the incoming stream comprises the charge mixed with at least a part of a hydrotreated liquid effluent obtained from step (b) and a hydrogen-rich gas, and is introduced into the first catalytic area at a temperature of 150-260[deg] C, in which the effluent obtained from the first catalytic area is then introduced, mixed with at least a part of a hydrotreated liquid effluent obtained from step (b) and preheated in the following catalytic areas at a temperature of 260-320[deg] C; and (b) separating the effluent obtained from the step (a) of hydrotreatment allowing the separation of a gaseous effluent and a hydrotreated liquid effluent of which at least a part is recycled at the top of each catalytic area of step (a), the process implementing in at least the catalytic areas following the first of step (a) of hydrotreatment, where bulk catalyst or supported catalyst comprises an active phase constituted of at least one element of group VIB, and the element of group VIB is molybdenum.						
2.	Method for hydrotreating renewable materials with improved gas recycling	BR102016016875	2016-08-02	IFP ENERGIES NOUVELLES* IFP ENERGIES NOW		
A process for the hydrotreatment of a feed obtained from renewable sources in which the total stream of feed F is divided into a number of different part-streams of feed F1 to Fn equal to the number of catalytic zones n, where n is 1 to 10. The mass flow rate of hydrogen sent to the first catalytic zone represents more than 80% by weight of the total mass flow rate of hydrogen used. The effluent from the reactor outlet undergoes at least one separation step. A portion of the liquid fraction is recycled to the catalytic zones in a manner such that the local recycle ratio for each of the beds is 2 or less, and the local dilution ratio over each of the beds is less than 4. (From US10190059 B2)						
3.	Process for hydrotreating renewable sources with indirect heating implementing a nickel and molybdenum catalyst with a specific atomic ratio	US20110098494	2011-04-28	IFP ENERGIES NOUVELLES*		
Treating charges obtained from renewable sources comprises: (a) hydrotreating comprising at least two catalytic areas in which the incoming stream comprises the charge mixed with at least a part of a hydrotreated liquid effluent obtained from step (b) and a hydrogen-rich gas is introduced into the first catalytic area at a temperature of 150-260[deg] C; and (b) separating the effluent obtained from the step (a) of hydrotreatment allowing the separation of a gaseous effluent and a hydrotreated liquid effluent of which at least a part is recycled at the top of each catalytic area of step (a). Treating charges obtained from renewable sources comprises: (a) hydrotreating comprising at least two catalytic areas in which the incoming stream comprises the charge mixed with at least a part of a hydrotreated liquid effluent obtained from step (b) and a hydrogen-rich gas is introduced into the first catalytic area at a temperature of 150-260[deg] C, in which the effluent obtained from the first catalytic area is then introduced, mixed with at least a part of a hydrotreated liquid effluent obtained from step (b) and preheated in the following catalytic areas at a temperature of 260-320[deg] C; and (b) separating the effluent obtained from the step (a) of hydrotreatment allowing the separation of a gaseous effluent and a hydrotreated liquid effluent of which at least a part is recycled at the top of each catalytic area of step (a), the process implementing in at least the catalytic areas following the first of step (a) of hydrotreatment, where bulk catalyst or supported catalyst comprises an active phase constituted of at least one element of group VIB and at least one element of group VIII, the elements are in the form of sulfur and the atomic ratio of the metal (or metals) of the group VIII to VIB is greater than 0 to less than 0.095.						
4.	Process for hydrotreating renewable sources with indirect heating	US20110094148	2011-04-28	IFP ENERGIES NOUVELLES*		
Treating charges obtained from renewable sources comprises: (a) hydrotreating comprising at least two catalytic areas in which the incoming stream comprises the charge mixed with at least a part of a hydrotreated liquid effluent obtained from step (b) and a hydrogen-rich gas, and is introduced into the first catalytic area at a temperature of 150-260[deg] C; and (b) separating the effluent obtained from the step (a) of hydrotreatment allowing the separation of a gaseous effluent and a hydrotreated liquid effluent. Treating charges obtained from renewable sources comprises: (a) hydrotreating comprising at least two catalytic areas in which the incoming stream comprises the charge mixed with at least a part of a hydrotreated liquid effluent obtained from step (b) and a hydrogen-rich gas, and is introduced into the first catalytic area at a temperature of 150-260[deg] C, in which the effluent obtained from the first catalytic area is then introduced, mixed with at least a part of a hydrotreated liquid effluent obtained from step (b) and preheated in the following catalytic areas at a temperature of 260-320[deg] C; and (b) separating the effluent obtained from the step (a) of hydrotreatment allowing the separation of a gaseous effluent and a hydrotreated liquid effluent of which at least a part is recycled at the top of each catalytic area of step (a).						
5.	Production of paraffin fuels using renewable materials by a continuous hydrogen-treatment method	CA2762032	2012-06-22	IFP ENERGIES NOUVELLES* IFP ENERGIES NOW		
The process for hydrotreatment of feedstock from renewable sources for production of paraffinic hydrocarbons in the presence of 50% of excess hydrogen of theoretical hydrogen consumption and by hydrotreatment conditions in a fixed bed reactor having 3-6 catalytic zones arranged in series and comprising a hydrotreating catalyst, comprises dividing the flow (F) of the total feedstock into a number of different partial flows (F1 to Fn) equal to the number (n) of catalytic zones in the reactor to produce an effluent containing paraffinic hydrocarbons. The process for hydrotreatment of feedstock from renewable sources for production of paraffinic hydrocarbons in the presence of 50% of excess hydrogen of theoretical hydrogen consumption and by hydrotreatment conditions in a fixed bed reactor having 3-6 catalytic zones arranged in series and comprising a hydrotreating catalyst, comprises dividing the flow (F) of the total feedstock into a number of different partial flows (F1 to Fn) equal to the number (n) of catalytic zones in the reactor to produce an effluent containing paraffinic hydrocarbons, where a first partial flow (F1) is injected in a first catalytic zone (Z1), the second partial flow (F2) is injected in a second catalytic zone (Z2) and then if n is greater than 2, the different partial flows are injected in the successive catalytic zones in increasing proportions such that F1/F is less than or equal to F2/F or is less than or equal to F3/F until F(n-1)/F is less than or equal to Fn/F, subjecting the effluent to a separation step for separating a gas fraction containing hydrogen, carbon monoxide, carbon dioxide, hydrogen sulfide, water and light gas and liquid fraction containing paraffinic hydrocarbon, recycling a part of the liquid fraction containing paraffinic hydrocarbon to the first catalytic zone so that a weight ratio between the recycle flow into the first catalytic zone and the partial flow (F1) introduced into the first catalytic zone is greater than 10. A weight ratio between the recycle flow into the first catalytic zone and total flow of feedstock is less than 0.5. The hydrotreatment step is operated at a temperature of 200-400[deg] C, a pressure of 2-15 MPa and a speed velocity of 0.1-5 h -> 1>and in a presence of total quantity of hydrogen mixed with feedstock such that a ratio of hydrogen or feedstock is 300-1500 Nm 3>of feedstock. The separation step is carried out by a high temperature high pressure separator operating without reduction of pressure at a temperature of 145-280[deg] C. The different partial flows are same or different. The feedstocks are co-treated with: a petroleum distillate type consisting of gas oils; kerosene atmospheric direct distillation of gas oil; and/or kerosene from conversion processes. The part of the liquid fraction containing paraffinic hydrocarbon undergoes hydroisomerization step in the presence of a hydroisomerization catalyst. The hydroisomerization step is operated at a temperature of 150-500[deg] C, a pressure of 1-10 MPa, a speed velocity of 0.1-10 h -> 1>and flow rate of hydrogen such that a ratio of hydrogen/hydrocarbon volume is 70-1000 Nm 3>/m 3>of feedstock. The hydroisomerization catalyst comprises a metal of group VIII and/or a metal of group VI B as a hydrogenating function and a molecular sieve or an amorphous mineral support as a hydroisomerization function. The effluent from the hydroisomerization step is subjected to a separation step to obtain a gaseous including a gasoline cut (150[deg] C-) and a distillate cut (150[deg] C+) containing kerosene and/or diesel.						
6.	Production of paraffin fuels using renewable materials by a continuous hydrogen-treatment method including a step of pre-treatment with hydrogen	BR102012028133	2013-05-07	IFP ENERGIES NOUVELLES* YEPPE ENERGY NEUVEL IFP ENERGIES NOUVELLES		
The method involves providing hydrogen in excess in a reactor. The reactor is arranged with a fixed bed having a set of catalytic zones (R1) that is placed in series. The set of catalytic zones includes a hydro-treating catalyst. A mixture of hydrocarbons is heated to a temperature ranging between 140 and 250 degrees Celsius. A set of recycled upstream catalytic zones is arranged with a specific mass ratio. A partial load is introduced in the former catalytic zones.						

7.	Method for the hydro-processing of a gas oil feedstock, hydro-processing unit for implementing said method, and corresponding hydro-refining unit	FR2910017	2008-06-20	TOTAL TOTAL MARKETING SERVICES*	
The invention relates to a method for the catalytic hydro-processing of a petroleum feedstock of the gas oil type and of a biological feedstock containing vegetal oils and/or animal fats, in a catalytic fixed-bed hydro-processing unit, said method being characterised in that the petroleum feedstock is introduced into the reactor upstream from the biological feedstock. The invention also relates to a catalytic hydro-processing unit for implementing said method, and to a corresponding hydro-refining unit.					
					
8.	Production of paraffin fuels using renewable materials by a continuous hydrogen-treatment method including a pre-treatment step	BR102012028129	2013-05-07	IFP ENERGIES NOUVELLES* YEPPE ENERGY NEUVEL IFP ENERGIES NOUVELLES	
The method involves providing hydrogen in excess in a reactor. The reactor is arranged with a fixed bed comprising a set of catalytic zones (R1) that is placed in series, where the set of catalytic zones includes a hydro-treating catalyst. A mixture of hydrocarbons is heated to temperature ranging between 130 and 320 degrees Celsius. A set of recycled upstream catalytic zones is arranged with a specific mass ratio. A partial load is introduced in the former catalytic zones.					
					
9.	Method for producing surfactants from renewable materials including a step of hydrotreating and a step of transforming paraffins into surfactants	WO2013190193	2013-12-27	IFP ENERGIES NOUVELLES* IFP ENERGIES NOW	
The invention relates to a method for producing surfactant compounds from a feedstock obtained from renewable sources, which includes a step of hydrotreating said feedstock in a fixed-bed reactor having a plurality of catalytic areas arranged in series and including a hydrotreating catalyst, wherein the feedstock is injected gradually and in increasing proportions in order to produce an effluent containing at least hydrocarbon compounds made up of straight-chain paraffins, the temperature of the stream injected at the input of the first catalytic area Z1 including the partial stream of the feedstock F1 mixed with the hydrogen-rich gas stream H1 entering the area Z1 and with a recirculated liquid R (F1 + R + H1) being higher than 250 °C, and the temperature of the streams at the input of the subsequent catalytic areas Z2 to Zn being higher than 300 °C; a step of separating said effluent into a gaseous fraction and a liquid hydrocarbon fraction made up of straight-chain paraffins; a step of recirculating at least one portion of the liquid hydrocarbon fraction made up of straight-chain paraffins to the first catalytic area Z1 such that the weight ratio of R/F1 is no lower than 8; and a step of transforming at least one portion of said liquid hydrocarbon fraction made up of straight-chain paraffins resulting from step a) into surfactant compounds.					
					
10.	Methods for the hydro-processing of a mixture containing vegetal or animal oils and petroleum feedstocks with quenching oil injection on the last catalytic bed	FR2910484	2008-06-27	IFP ENERGIES NOUVELLES*	
The invention relates to a hydro-processing method that uses two catalytic beds with the introduction, on the last catalytic bed, of animal or vegetal oils, for co-processing a mixture containing animal or vegetal oils and petroleum feedstocks (gas oil (GO) feedstock or medium distillates) in order to produce gas oil effluents compliant with the specifications and with an improved ketane index. The first catalytic bed is solely dedicated to deep desulphurisation reactions (HDS1) of a petroleum-type feedstock. The effluents of the first catalytic bed, having an effluent sulphur content equal to or lower than 50 mg/kg, are divided into two flows. The first larger flow is directed towards the gas oil pool, and the second flow is mixed with vegetal or animal oils. This oil - petroleum feedstock mixture is used for increasing the temperature of the animal or vegetal oils while decreasing the temperature of the hydro-processed effluents without the drawbacks of the thermal instability of the vegetal oils. The oil - petroleum feedstock mixture is then submitted to a softer hydro-processing (HDT2). The effluents obtained at the output of the second catalytic bed can optionally be mixed with the larger flow from the first bed. It is thus possible to substantially improve the economical aspect of the method, the tolerance concerning the specifications on animal or vegetal oils, and the quality of the products thus obtained.					
					
11.	Method for the upgrading of optimized bio-oils hydrocarbon in fuels	FR3024156	2016-01-29	IFP ENERGIES NOW*	
The present invention relates to a method of producing hydrocarbon products from a feedstock comprising at least one bio-oil, said load being introduced into at least a first step of pre-hydroprocessing, a second step of hydrotreating in the presence of hydrogen and a catalyst of hydrotreating comprising at least one transition metal selected from the elements of groups 3 to 12 of the periodic table and at least one support chosen from the activated carbons, silicon carbides, silicas, transition aluminas, silicas alumina, zirconium oxide, cerium oxide, titanium oxide and the aluminates of transition metals, taken alone or in mixture, to obtain at least a liquid effluent comprising at least one aqueous phase and at least one organic phase, a third step of hydroprocessing and/or hydrocracking of at least a portion of the organic phase of the effluent from the step of hydrotreating in order to obtain a hydrocarbon effluent, wherein at least a portion of the organic phase of the effluent from the step of hydrotreating is) recycled in the first step of pre-Hydrotreatment, in admixture with said filler comprising at least one bio-oil, with a recycle rate equal to the ratio of the mass flow rate of said organic phase on the mass flow rate between 0.05 bio-oil and 3.					
					
12.	Method for hydro-processing a mixture containing animal or vegetal oils and petroleum cuts by intermediate stripping	FR2910485	2008-06-27	IFP ENERGIES NOUVELLES*	
The invention relates to a hydro-processing method (HDT) that uses two units having different operational conditions, with an intermediate stripping for co-processing a mixture containing vegetal or animal oils and petroleum cuts (diesel cuts (GO) or middle distillates) in order to produce specification-compliant diesel fuel bases. The first unit (HDT1) is more particularly dedicated to reactions concerning vegetal or animal oils in a same mixture while pre-processing the hydrocarbon load, and the second unit (HDS2) has a higher severity for obtaining specification-compliant diesel fuel, in particular in terms of effluent sulphur content, density and cold properties. The economy of the method as well as the activity and the stability of the catalyst in the second unit are greatly improved by the intermediate stripping.					
					
13.	Method for the hydrotreatment of a diesel fuel load, hydrotreatment unit for implementing said method, and corresponding hydrotreating unit	FR2913024	2008-08-29	TOTAL TOTAL MARKETING SERVICES*	
The invention relates to a method for the catalytic hydrotreatment of a load based on a diesel fuel oil and a biological load based on plant oils and/or animal fats in a hydrotreatment unit. The invention is characterised in that the hydrotreatment unit comprises at least one hydrotreatment reactor operating on a countercurrent. The invention also relates to a hydrotreatment unit for implementing said method, and a corresponding hydrotreating unit.					
					

14.	Spherical material based on heteropolyanions trapped in a mesostructured oxide matrix and use thereof as catalyst in hydrocarbon refining processes	WO2012085355	2012-06-28	CNRS - CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE* IFP ENERGIES NOUVELLES* IFP ENERGIES NOW SANTHOUR NACIONAL DE LA CIELSEZ SHAAN TIJK UNIVERSITE PIERRE & MARIE CURIE* UNIVERSITE PIERRE E MARIE CURIE UNIVERSITE PIERRE & MARIE CURIE	
An inorganic material is described consisting of at least two elementary spherical particles, each of said spherical particles comprising metallic particles in the form of polyoxometalate of formula (X_xM_mO_yH_h)_q- where H is hydrogen, O is oxygen, X is an element chosen from phosphorus, silicon, boron, nickel and cobalt and M is one or more elements chosen from vanadium, niobium, tantalum, molybdenum, tungsten, iron, copper, zinc, cobalt and nickel, x being equal to 0, 1, 2 or 4, m being equal to 5, 6, 7, 8, 9, 10, 11, 12 and 18, y being between 17 and 72, h being between 0 and 12 and q being between 1 and 20 (y and q being integers). Said metallic particles are present within a mesostructured matrix based on an oxide of an element Y chosen from the group consisting of silicon, aluminium, titanium, tungsten, zirconium, gallium, germanium, tin, antimony, lead, vanadium, iron, manganese, hafnium, niobium, tantalum, yttrium, cerium, gadolinium, europium and neodymium and the mixture of at least two of these elements. Said matrix has pores with a diameter between 1.5 and 50 nm and amorphous walls with a thickness between 1 and 30 nm, said elementary spherical particles having a maximum diameter of 200 microns.					