bringing a stream into contact with the catalytically active material under effective conditions for the implied catalytic reaction to take place. Such conditions typically relate to temperature, pressure and stream composition. A typical example of a material catalytically active would be a classical refinery hydrotreatment catalyst, such as one or more sulfided base metals on a refractive support.

[0015] The term “precipitation temperature” of ammonium halides is meant to cover the temperature (under the given conditions, such as concentration and pressure) at which gaseous ammonia and gaseous inorganic halides (typically hydrogen halides) precipitate, either by reacting to form solid ammonium halide crystals. For ammonium chloride in concentrations above 500 ppm_{wt} and a pressure of 100 Barg this temperature is approximately 280°C as an example, and typically for the relevant conditions this temperature will be in the range 150-300°C.

[0016] The term “thermal decomposition” shall for convenience be used broadly for any decomposition process, in which a material is partially decomposed at elevated temperature (typically 250°C to 800°C or perhaps 1000°C), in the presence of substoichiometric amount of oxygen (including no oxygen). The product will typically be a combined liquid and gaseous stream, as well as an amount of solid char. The term shall be construed to included processes known as pyrolysis, partial combustion, or hydrothermal liquefaction.

[0017] The unit “Barg”, shall in compliance with the practice of the field be used to denote Bar, gauge, i.e. the pressure relative to atmospheric pressure and all pressures reported and compared shall be pressures relative to atmospheric pressure.

Solution to Problem

[0018] The process and the system disclosed may be found useful where the feed to a hydrotreatment process comprises halides.

[0018a] In one aspect, there is provided a process for conversion of a hydrocarbonaceous feed comprising at least 10 ppm_{wt} and less than 10000 ppm_{wt} of one or more halides, and at least 20 ppm_{wt} and less than 100000 ppm_{wt} organically bound nitrogen, to a hydrocarbon product stream by hydrotreatment, under effective hydrotreatment conditions, in the presence of a material catalytically active in hydrotreatment and an amount of hydrogen, wherein said conversion provides a mixed product stream comprises an amount of inorganic halides and an amount of ammonia, said process comprising the steps of separating in a first separation step at a first pressure and at a first separation temperature the mixed product stream to provide an overhead stream and a bottoms stream, combining the overhead stream with an amount of wash water and separating, in

a second separation step at a second pressure and at a second temperature, the combined overhead stream and wash water into a non-polar stream of hydrocarbon condensate product, a polar stream of wash water comprising ammonium halides and a gas stream rich in hydrogen, in a third separation step at a third pressure and at a third temperature, separating the bottoms stream in a liquid hydrocarbon and a first gas phase stream, in a fourth separation step at a fourth pressure and at a fourth temperature, separating the hydrocarbon condensate product into a purified hydrocarbon condensate and a second gas phase stream, characterized in that the first separation temperature being above the precipitation temperature with respect to ammonium halides in the mixed product stream, and the second pressure being at least 80% of said first pressure, the third pressure being below 50% of said first pressure and and the fourth pressure being from 10% below to 10% above said third pressure.

[0018b] In another aspect, there is provided a process for conversion of a raw feed stream rich in molecules comprising C, H, N and one or more halides, and optionally O, S, Si, and other elements, said process comprising a step of thermal decomposition of said raw feed stream, to provide a precursor to a hydrocarbonaceous feed or a hydrocarbonaceous feed, optionally a step of pre-treatment, purifying the precursor to hydrocarbonaceous feed to provide the hydrocarbonaceous feed, a hydrotreatment step for converting the hydrocarbonaceous feed in the presence of hydrogen, in accordance with any of the previous claims, to provide a hydrocarbon product stream.

[0018c] In another aspect, there is provided a system for hydrotreatment of a hydrocarbonaceous stream comprising a hydrotreatment reactor containing a material catalytically active in hydrotreatment, said hydrotreatment reactor comprising an inlet for introducing a hydrogen enriched hydrocarbon stream and an outlet for withdrawing a first hydrocarbon product stream, a first means of separation having at least an inlet, an overhead outlet and a bottoms outlet, a first means of mixing having two inlets and an outlet, a second means of separation, having an inlet and a liquid polar phase outlet, a liquid non-polar phase outlet and a gas phase outlet, a third means of separation having at least an inlet, an overhead outlet and a bottoms outlet, a fourth means of separation, having an inlet, a liquid outlet and a gas phase outlet, wherein said outlet for withdrawing a first product stream is in fluid communication with the inlet of said first means of separation, wherein said overhead outlet is in fluid communication with the inlet of said first inlet of the first means of mixing, wherein a source of water is in fluid communication with the second inlet of the first means of mixing, wherein the outlet of the first means of mixing is in fluid communication with the inlet of the second means of separation, wherein the liquid outlet of the first means of separation is in fluid communication with the inlet of

said third means of separation, wherein the liquid non-polar phase outlet of the second means of separation is in fluid communication with the inlet of said fourth means of separation, and wherein one or more of the liquid outlets of said third or fourth means of separation are individually or collectively in fluid connection with one or more product outlets.

[0018d] Examples of such feeds include the products of processes such as the product from thermal decomposition of halide rich materials, such as waste plastic, comprising e.g. PVC, other halide containing plastics, PTFE and similar materials and plastic comprising brominated flame retardents, alone or in mixed waste as well as of biological materials with high halide content, e.g. straw and algae, as well as other products of thermal decomposition or soluthermal liquefication processes using water or other solvents to aid the decomposition, kerogenic feeds such as coal tar or shale oil. The feed comprising halides may also originate from non-pyrolyzed renewable feedstocks, e.g. waste cooking oil, algae lipids, especially when grown in salt water, or other biological feeds comprising hydrocarbons, nitrogen and halides.

[0019] Ammonia and halides react to form salts, e.g. ammonium chloride, at temperatures below the precipitation temperature typically 150 °C to 300°C. Precipitation of such salts may result in partial or complete blocking of process lines as well as potential