and wherein the combined hydrocarbon product stream and wash water are separated in a non-polar stream of hydrocarbon product and a polar stream of wash water comprising ionic halides,
such that from 50%, 90% or 99% to 100% of said ionic halides are transferred from said hydrocarbon product stream to the polar stream of wash water comprising ionic halides,
characterized in said polar stream of wash water comprising ionic halides being directed to a means of concentrating, to provide a stream of purified water and a stream of brine having a concentration of ionic halides being more than 2 times, 5 times or 10 times and less than 50 times or 100 times above that of the polar stream of waste water comprising ionic halides, with the associated benefit of such a process being able to receive a hydrocarbonaceous mixture with a high amount of halides, purifying it to a quality hydrocarbon product while minimizing the consumption of water.

In one aspect of the present disclosure, there is provided a process for conversion of a hydrocarbonaceous feed originating from thermal decomposition comprising at least 100 ppmw or 500 ppmw and less than 1000 ppmw, 5000 ppmw or 10000 ppmw halides, to a hydrocarbon product stream by hydrotreatment, in the presence of a material catalytically active in hydrotreatment and an amount of hydrogen,
and wherein said hydrocarbon product stream comprises an amount of ionic halides, wherein at least an amount of said hydrocarbon product stream is combined with an amount of wash water to form a combined hydrocarbon product stream, wherein the weight ratio between wash water and hydrocarbon product stream water is above 1:10, 1:5 or 1:2 and below 1:1, 2:1 or 10:1,
and wherein the combined hydrocarbon product stream is separated in a means of phase separation providing a gas phase outlet,
a non-polar stream of hydrocarbon product and a polar stream of wash water comprising ionic halides,
such that from 50%, 90% or 99% to 100% of said ionic halides are transferred from said hydrocarbon product stream to the polar stream of wash water comprising ionic halides,

characterized in said polar stream of wash water comprising ionic halides being directed to a means of concentrating, to provide a stream of purified water and a stream of brine having a concentration of ionic halides being more than 2 times, 5 times or 10 times and less than 50 times or 100 times above that of the polar stream of wash water comprising ionic halides

wherein said amount of wash water comprises at least a portion of said purified water.

In another aspect of the present disclosure, there is provided a process for conversion of a raw feed stream rich in molecules comprising C, H and a halide, and optionally O, N, Si, and other elements, such as a mixture rich in plastic, lignin, straw, lignocellulosic biomass or aquatic biological material, said process involving

a. a step of thermal decomposition of said raw feed stream, to provide a precursor to a hydrocarbonaceous feed or a hydrocarbonaceous feed,
b. optionally a step of pre-treatment, purifying the precursor to hydrocarbonaceous feed to provide a hydrocarbonaceous feed
c. 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.

In a further aspect of the present disclosure, there is provided a system for hydrotreatment of a hydrocarbonaceous stream comprising

a. a hydrotreament reactor containing a material catalytically active in hydrotreament, said hydrotreament reactor comprising an inlet for inletting a hydrogen enriched hydrocarbon stream and an outlet for outletting a first product stream,
b. a means of mixing having two inlets and an outlet,
c. a means of phase separation, having an inlet and a liquid polar phase outlet, liquid non-polar phase outlet and gas phase outlet,
d. a means of concentrating, having an inlet, a concentrated brine outlet and a purified water outlet, wherein said outlet for outletting a first product stream is in fluid communication with a first inlet of the means of mixing,

wherein the outlet of the means of mixing is in fluid communication with the inlet of the means of phase separation, and the liquid polar phase outlet of the means of phase separation is in fluid communication with the inlet of the means of concentrating,

wherein the purified water outlet of the means of concentrating is in fluid communication with a second inlet of the means of mixing optionally in combination with a further source of purified water
and wherein the liquid non-polar phase outlet of the means of phase separation is configured for providing a hydrocarbon product.

In a further example said means of concentrating is an evaporator, heating the polar stream of wash water comprising ionic halides, to evaporate an amount of water, constituting said purified water, with the associated benefit of an evaporator being an efficient means of concentrating especially in a refinery environment where energy may be available.

In a further example said evaporator is a falling film evaporator configured for flowing the polar stream of wash water comprising ionic halides over a heated surface, and further configured for collecting the evaporated water and directing it as the stream of purified water, with the associated benefit of a falling film evaporator being highly effective in providing an evaporator with a high evaporation surface and a small footprint.

In a further example said means of concentration is a membrane separator or a reverse osmosis separator, with the associated benefit of providing separation with requiring input of thermal energy.

In a further example the pH of said polar stream of wash water comprising ionic halides is adjusted to a value between 6.5 and 9 by addition of an amount of base or acid to either the stream of wash water or the polar stream of wash water comprising

CLAIMS

1. A process for conversion of a hydrocarbonaceous feed originating from thermal decomposition comprising at least 100 ppmw or 500 ppmw and less than 1000 ppmw, 5000 ppmw or 10000 ppmw halides, to a hydrocarbon product stream by hydrotreatment, in the presence of a material catalytically active in hydrotreatment and an amount of hydrogen,
and wherein said hydrocarbon product stream comprises an amount of ionic halides,
wherein at least an amount of said hydrocarbon product stream is combined with an amount of wash water to form a combined hydrocarbon product stream,
wherein the weight ratio between wash water and hydrocarbon product stream water is above 1:10, 1:5 or 1:2 and below 1:1, 2:1 or 10:1,
and wherein the combined hydrocarbon product stream is separated in a means of phase separation providing a gas phase outlet,
a non-polar stream of hydrocarbon product and a polar stream of wash water comprising ionic halides,
such that from 50%, 90% or 99% to 100% of said ionic halides are transferred from said hydrocarbon product stream to the polar stream of wash water comprising ionic halides,
characterized in said polar stream of wash water comprising ionic halides being directed to a means of concentrating, to provide a stream of purified water and a stream of brine having a concentration of ionic halides being more than 2 times, 5 times or 10 times and less than 50 times or 100 times above that of the polar stream of wash water comprising ionic halides
wherein said amount of wash water comprises at least a portion of said purified water.

2. The process according to claim 1, wherein said means of concentrating is an evaporator, heating the polar stream of wash water comprising ionic halides, to evaporate an amount of water, constituting said stream of purified water.

3. The process according to claim 2, wherein said evaporator is a falling film evaporator configured for flowing the polar stream of wash water comprising ionic

halides over a heated surface, and further configured for collecting the evaporated water and directing it as the stream of purified water.

4. The process according to claim 1, wherein said means of concentration is a membrane separator or a reverse osmosis separator.

5. The process according to claim 1, 2, 3 or 4, wherein the pH of said polar stream of wash water comprising ionic halides is adjusted to a value between 6.5 and 9 by addition of an amount of base or acid to either the stream of wash water or the polar stream of wash water comprising ionic halides.

6. A process for conversion of a raw feed stream rich in molecules comprising C, H and a halide, and optionally O, N, Si, and other elements, such as a mixture rich in plastic, lignin, straw, lignocellulosic biomass or aquatic biological material, said process involving
    a. a step of thermal decomposition of said raw feed stream, to provide a precursor to a hydrocarbonaceous feed or a hydrocarbonaceous feed,
    b. optionally a step of pre-treatment, purifying the precursor to hydrocarbonaceous feed to provide a hydrocarbonaceous feed
    c. 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.

7. The process according to claim 6, followed by the step of directing the hydrocarbon product stream to a steam-cracking process.

8. A system for hydrotreatment of a hydrocarbonaceous stream comprising
    a. a hydrotreament reactor containing a material catalytically active in hydrotreament, said hydrotreament reactor comprising an inlet for inletting a hydrogen enriched hydrocarbon stream and an outlet for outletting a first product stream,
    b. a means of mixing having two inlets and an outlet,
    c. a means of phase separation, having an inlet and a liquid polar phase outlet, liquid non-polar phase outlet and gas phase outlet,

d. a means of concentrating, having an inlet, a concentrated brine outlet and a purified water outlet, wherein said outlet for outletting a first product stream is in fluid communication with a first inlet of the means of mixing,

wherein the outlet of the means of mixing is in fluid communication with the inlet of the means of phase separation, and the liquid polar phase outlet of the means of phase separation is in fluid communication with the inlet of the means of concentrating, wherein the purified water outlet of the means of concentrating is in fluid communication with a second inlet of the means of mixing optionally in combination with a further source of purified water

and wherein the liquid non-polar phase outlet of the means of phase separation is configured for providing a hydrocarbon product.