

Claims

1. A method for production of a hydrocarbon mixture from a feedstock stream comprising oxygenates and a make-up hydrogen gas stream, comprising the steps of directing a feed stream, comprising the feedstock stream comprising oxygenates, the make-up hydrogen gas stream and a hydrogen rich gas stream, to contact a material catalytically active in deoxygenation under active deoxygenation conditions and withdrawing a deoxygenated product stream, characterized in the hydrogen rich gas stream comprising at least 70% hydrogen, at least 0.1% carbon oxides and at least 50 ppm H₂S.
2. A method according to claim 1 further characterized in the hydrogen rich gas stream comprising at least 0.1% carbon dioxide.
3. A method according to claim 1 or 2 further characterized in the hydrogen rich gas stream comprising at least 0.1% carbon monoxide.
4. A method according to claim 1, 2 or 3, wherein said feedstock stream comprising oxygenates, comprises a fresh feedstock rich in oxygenates and a diluent, said diluent being a further feedstock or a recycled liquid stream.
5. A method according to claim 4 further characterized in said liquid diluent comprising less than 0.1 wt% atomic oxygen.
6. A method according to claim 4 or 5 wherein said liquid diluent comprises an amount of said deoxygenated product stream or comprises an amount of a product from a process step receiving an amount of said deoxygenated product stream.
7. A method according to claim 4, 5 or 6 further characterized in said liquid diluent being a stream comprising fossil feedstock.
8. A method according to claim 1, 2, 3, 4, 5, 6 or 7 further characterized in the amount of sulfur contained in said hydrogen rich gas stream relative to the

amount of sulfur in the gas phase of the combined feed stream is at least 40%, 60% or 80%.

- 5 9. A method according to claim 1, 2, 3, 4, 5, 6, 7 or 8 further characterized in said material catalytically active in deoxygenation comprising molybdenum and/or nickel, on a support of refractory material and comprising less than 0.1 wt% cobalt.
- 10 10. A method according to claim 1, 2, 3, 4, 5, 6, 7, 8 or 9 further characterized in at least an amount of said deoxygenated product stream being directed to contact a material catalytically active in hydrocracking and/or hydroisomerization under active hydrocracking and/or hydroisomerization conditions and withdrawing a further treated product stream.
- 15 11. A method according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 wherein said deoxygenated product stream or said further treated product stream is separated in a gas stream and a liquid stream, and wherein said hydrogen rich gas stream comprises a recycled amount of said gas stream.
- 20 12. A method according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or 11 wherein less than 50 vol%, such as less than 10 vol%, less than 1 vol% or 0 vol%, of the carbon oxides in the recycled amount of said gas stream are removed prior to the recycled amount of said gas stream being directed to contact said material catalytically active in deoxygenation.
- 25 13. A method according to claim 12, wherein said carbon oxides are removed from the gas stream by a process involving membrane separation or by withdrawal of a purge gas stream.
- 30 14. A method according to claim 12 or 13, wherein said removal of carbon oxides does not involve scrubbing of the gas stream.
15. A process plant section for conversion of a feedstock stream comprising oxygenates to a hydrocarbon mixture, comprising a deoxygenation reactor having

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an inlet and an outlet, a separation section having an inlet and a gas outlet, an aqueous phase outlet and a hydrocarbon phase outlet, wherein said deoxygenation reactor inlet is configured for receiving said feedstock and a recycled hydrogen rich gas stream, said separator is configured for receiving a deoxygenated product stream from said deoxygenation reactor outlet, and the separation section gas outlet is configured for providing said recycled hydrogen rich gas stream, characterized in said process plant section not comprising an amine scrubber configured for treating the stream of the separation section gas outlet.