# CLAIMS

1. A process for the rejuvenation of an at least partially spent catalyst resulting from a hydrotreating process, said at least partially spent catalyst resulting from a fresh catalyst comprising at least one metal from group VIII, at least one metal from group VIb, an oxide support, and optionally phosphorus, said at least partially spent catalyst being a non-regenerated at least partially spent catalyst which has not undergone a regeneration stage after its use in the hydrotreating process and additionally comprising carbon in a content of between 2% and 20% by weight, with respect to the total weight of the at least partially spent catalyst, and sulfur in a content of between 1% and 8% by weight, with respect to the total weight of the at least partially spent catalyst, said process comprising the following stages:

   a) said at least partially spent catalyst is brought into contact with an impregnation solution containing a compound comprising a metal from group VIb,

   b) a drying stage is carried out at a temperature of less than 200°C so as to obtain a rejuvenated catalyst, without subsequent calcination.

2. The process as claimed in the preceding claim, in which, in stage a), the molar ratio of the metal from group VIb added per metal from group VIb already present in the at least partially spent catalyst is between 0.15 and 2.5 mol/mol.

3. The process as claimed in either of the preceding claims, in which, in stage a), the impregnation solution additionally contains a compound comprising a metal from group VIII; the molar ratio of the metal from group VIII added per metal from group VIII already present in the at least partially spent catalyst is between 0.1 and 2.5 mol/mol.

4. The process as claimed in one of the preceding claims, in which, in stage a), the impregnation solution additionally contains phosphorus; the molar ratio of the phosphorus added per metal from group VIb already present in the at least partially spent catalyst is between 0.1 and 2.5 mol/mol.

5. The process as claimed in one of the preceding claims, in which, in stage a), the impregnation solution additionally contains an organic compound containing oxygen and/or nitrogen and/or sulfur; the molar ratio of the organic compound added per metal from group VIb already present in the at least partially spent catalyst is between 0.01 and 5 mol/mol.

6. The process as claimed in the preceding claim, in which the organic compound containing oxygen and/or nitrogen and/or sulfur is chosen from a compound comprising one or more chemical functional groups chosen from a carboxylic, alcohol, thiol, thioether, sulfone, sulfoxide, ether, aldehyde, ketone, ester, carbonate, amine, nitrile, imide, oxime, urea or amide functional group or also compounds including a furan ring or also sugars.

7. The process as claimed in the preceding claim, in which the organic compound containing oxygen and/or nitrogen and/or sulfur is chosen from γ-valerolactone, 2-acetylbutyrolactone, triethylene glycol, diethylene glycol, ethylene glycol, ethylenediaminetetraacetic acid, maleic acid, malonic acid, citric acid, gluconic acid, di($C_1$-$C_4$ alkyl) succinate, glucose, fructose, sucrose, sorbitol, xylitol, γ-ketovaleric acid, dimethylformamide, 1-methyl-2-pyrrolidinone, propylene carbonate, 2-methoxyethyl 3-oxobutanoate, bicine, tricine, 2-furaldehyde, 5-hydroxymethylfurfural, 2-acetylfuran, 5-methyl-2-furaldehyde, ascorbic acid, butyl lactate, ethyl 3-hydroxybutanoate, ethyl 3-ethoxypropanoate, 2-ethoxyethyl acetate, 2-butoxyethyl acetate, 2-hydroxyethyl acrylate, 1-vinyl-2-pyrrolidinone, 1,3-dimethyl-2-imidazolidinone, 1- (2-hydroxyethyl)-2-pyrrolidinone, 1-(2-hydroxyethyl)-2,5-pyrrolidinedione, 5-methyl-2(3H)-furanone, 1-methyl-2-piperidinone and 4-aminobutanoic acid.

8. The process as claimed in one of the preceding claims, in which, in stage a), the impregnation solution comprises a water-ethanol or water-methanol mixture.

9. The process as claimed in one of the preceding claims, in which the rejuvenation stage a) is preceded by a deoiling stage which comprises bringing the at least partially spent catalyst into contact with a stream of inert gas at a temperature of between 300°C and 400°C.

10. The process as claimed in one of the preceding claims, in which the fresh catalyst has a content of metal from group VIb of between 1% and 40% by weight of oxide of said metal from group VIb, with respect to the total weight of the catalyst.

11. The process as claimed in one of the preceding claims, in which the fresh catalyst has a content of metal from group VIII of between 0.1% and 10% by weight of oxide of said metal from group VIII, with respect to the total weight of the catalyst.

12. The process as claimed in one of the preceding claims, in which the fresh catalyst has a phosphorus content of between 0.3% and 10% by weight, expressed as $P_2O_5$, with respect to the total weight of the catalyst and the phosphorus/(metal from group VIb) molar ratio in the catalyst is between 0.1 and 0.7.

13. The process as claimed in one of the preceding claims, in which the oxide support of the fresh catalyst is chosen from aluminas, silica, silica-aluminas or also titanium or magnesium oxides, used alone or as a mixture with alumina or silica-alumina.

14. The process as claimed in one of the preceding claims, in which the at least partially spent catalyst results from a process for the selective hydrodesulfurization of a sulfur-containing olefinic gasoline cut.

15. A process for the hydrodesulfurization of a sulfur-containing olefinic gasoline cut in which said gasoline cut, hydrogen and the catalyst rejuvenated according to the process as claimed in one of claims 1 to 14 are brought into contact, said hydrodesulfurization process being carried out at a temperature of between 200°C and 400°C, a total pressure of between 1 and 3 MPa, an hourly space velocity, defined as being the flow rate by volume of feedstock relative to the volume of catalyst, of between 1 and 10 $h^{-1}$ and a hydrogen/gasoline feedstock ratio by volume of between 100 and 1200 Sl/l.

16. The process as claimed in the preceding claim, in which the rejuvenated catalyst is subjected to a sulfidation stage before or during the hydrodesulfurization process.

17. The process as claimed in either of claims 15 and 16, which is carried out in a catalytic bed of a reactor of the fixed bed type containing several catalytic beds; at least one other catalytic bed upstream or downstream of the catalytic bed containing the rejuvenated

catalyst in the direction of the circulation of the feedstock contains at least in part a fresh catalyst and/or a regenerated catalyst.

18. The process as claimed in one of claims 15 to 17, which is carried out in at least two reactors in series of the fixed bed type or of the ebullated bed type; at least one of the reactors contains a rejuvenated catalyst while another reactor contains a fresh catalyst or a regenerated catalyst, or a mixture of a rejuvenated catalyst and of a fresh and/or regenerated catalyst, in any order, with or without removal of at least a part of the $H_2S$ from the effluent resulting from the first reactor before treating said effluent in the second reactor.