CLAIMS

1. A hydrotreatment process comprising:

   a. providing in a reactor a liquid feedstock;

   b. hydrotreating the liquid feedstock in liquid phase and at a temperature selected from the range 280-380°C in the presence of 10-500ppm of catalytic MoS_2 microparticle slurry, to provide a liquid reaction product with decreased heteroatom content; and wherein

   at least 90% of the catalytic MoS_2 microparticles in the MoS_2 microparticle slurry have a size below 7µm, wherein the size of a microparticle is expressed as an average of the longest dimension and the shortest dimension of the microparticle.

2. The hydrotreatment process of claim 1, wherein the feedstock contains about 1-40wt-% oxygen, preferably 5-40wt-% oxygen.

3. The hydrotreatment process of claim 1 or 2, wherein the feedstock contains at least one of: crude tall oil, tall oil pitch, crude fatty acid, tall oil fatty acid, distilled tall oil, liquefied lignocellulosic biomass, bio-oil, biocrude, liquefied waste polymer, or a combination thereof.

4. The hydrotreatment process of any one of claims 1-3, wherein the temperature is selected from the range 320-370°C, preferably from the range 330-360°C.

5. The hydrotreatment process of any one of claims 1-3, wherein the feedstock contains liquefied polymer waste and the temperature is selected from the range 280-320°C, preferably from the range 290-310°C.

6. The hydrotreatment process of any one of claims 1-5, wherein the hydrotreating step is carried out at a pressure selected from the range 70-200bar such that the feedstock is in liquid phase.

7. The hydrotreatment process of any one of claims 1-6, wherein the feedstock contains liquefied polymer waste and the pressure is selected from the range 70-90bar, preferably from the range 75-85bar.

8. The hydrotreatment process of any one of claims 1-7, wherein the pressure is controlled by feeding hydrogen gas into the reactor.

9. The hydrotreatment process of any one claims 1-8, wherein the hydrotreatment removes at least 50% of sulphur, at least 40% of nitrogen, and optionally at least 50% of oxygen from the feedstock.

10. The hydrotreatment process of any one of claims 1-9, wherein the catalytic MoS_2 microparticles are provided in at least partially crystalline form in the reactor.

11. The hydrotreatment process of any one of claims 1-10, wherein the MoS_2 microparticle slurry is used in an amount of 10 ppm – 2 wt-%, based on the amount of Mo in the total amount of the reaction mixture in the reactor.

12. The hydrotreatment process of any one claims 1-10, wherein the feedstock contains liquefied polymer waste and the MoS_2 microparticle slurry is used in an amount of 10ppm – 500ppm, based on the amount of Mo in the total amount of the reaction mixture in the reactor.

13. The hydrotreatment process of any one of claims 1-12, wherein at least 90% of the particles have an aspect ratio of 0.40-1.0.

14. The hydrotreatment process of any one of claims 1-13, wherein the reaction product predominantly contains hydrocarbons having a maximum boiling point of 565°C at atmospheric pressure.

15. The hydrotreatment process of any one of claims 1-14, wherein the process is carried out in a stirred tank reactor.

16. A process for manufacturing catalytic molybdenum sulphide microparticles comprising:
    a. providing in a hydrocarbon solvent a Mo precursor and a H_2S source to provide a reaction mixture;
    b. hydrogenating, under vigorous stirring, the reaction mixture at a temperature of at least 180°C, such that the combination of temperature and pressure is sufficient for evaporating water in the reaction mixture.

17. The process of claim 16, wherein the Mo precursor is selected from molybdenum 2-ethyl hexanoate, carboxylate anion of 3-cyclopentylpropionic acid, cyclohexanebutyric acid, biphenyl-2-carboxylic acid, 4-heptylbenzoic acid, 5-phenylvaleric acid, and geranic acid (3,7-dimethyl-2,6-octadienoic acid).

18. The process of any one of claims 16-17, wherein the H_2S source is selected from dimethyl disulphide, dimethyl sulphide, disulphide, alkyl disulphide, polysulphide, di-tert-dodecyl polysulphide, mercaptan, n-butyl mercaptan, H_2S gas, and any combination thereof.

19. The process of any one of claims 16-18 wherein an amount of H_2S source and an amount of Mo precursor is used, which provides a molar excess of sulphur to molybdenum, such as at least 4 mol S / mol Mo, at least 5 mol S / mol Mo, at least 6 mol S / mol Mo, at least 7 mol S / mol Mo, or 4-7 mol S / mol Mo, or 5-6 mol S / mol Mo.