Claims

1. Process for the hydrogenation of an unsaturated hydrocarbon feedstock comprising:
(1) preparing a granular material, wherein the particles of the granular material comprise a hydrogenation catalyst, and one or more organic compounds, wherein the one or more organic compounds comprise one or more carboxlic acid and/or one or more ester and/or one or more ether moieties;
(2) providing an unsaturated hydrocarbon feedstock;
(3) preparing a mixture comprising the granular material obtained in (1), the unsaturated hydrocarbon feedstock provided in (2), hydrogen gas, and optionally a solvent system;
(4) heating the mixture prepared in (3) to a temperature in the range of from 210 to 360°C for hydrogenating the hydrocarbon feedstock.

2. The process of claim 1, wherein for preparing the granular material in (1), the process comprises:
(1.a) providing a hydrogenation catalyst;
(1.b) providing one or more organic compounds comprising one or more carboxylic acid and/or one or more ester and/or one or more ether moieties;
(1.c) optionally heating the one or more organic compounds provided in (1.b) to a temperature above the melting point of the one or more organic compounds;
(1.d) dispersing the hydrogenation catalyst provided in (1.a) in the one or more organic compounds provided in (1.b) and optionally heated in (1.c);
(1.e) shaping the dispersion obtained in (1.d), preferably into particles;
(1.f.) cooling the shaped dispersion obtained in (1.e) to a temperature below the melting point of the one or more organic compounds.

3. The process of claim 1 or 2, wherein in (1) the one or more organic compounds comprise one or more compounds selected from the group consisting of triglycerides, fatty acids, and mixtures of two or more thereof.

4. The process of any one of claims 1 to 3, wherein the unsaturated hydrocarbon feedstock comprises one or more alkanes.

5. The process of any one of claims 1 to 4, wherein the unsaturated hydrocarbon feedstock comprises one or more compounds selected from the group consisting of C5 resins, C9 resins, C5/C9 copolymer resins, dicyclopentadiene resins, and mixtures of two or more thereof.

6. The process of any one of claims 1 to 5, wherein the solvent system comprises one or more hydrocarbons.

7. The process of any one of claims 1 to 6, wherein the weight ratio of the hydrogenation catalyst to the one or more organic compounds in the particles of the granular material in (1) is in the range of from 5:95 to 75:25.

8. The process of any one of claims 1 to 7, wherein the hydrogenation catalyst in (1) comprises one or more transition metals selected from the group consisting of Ni, Rh, Ir, Ru, Pt, Pd, and combinations of two or more thereof.

9. The process of claim 8, wherein the amount of the one or more transition metals in the hydrogenation catalyst is in the range of from 5 to 95 weight-% calculated as the element and based on 100 weight-% of the hydrogenation catalyst.

10. The process of claim 8 or 9, wherein the one or more transition metals are present in the elemental form in an amount of 50 weight-% or more based on 100 weight-% of the one or more transition metals calculated as the element.

11. The process of any one of claims 1 to 10, wherein the pore volume of the hydrogenation catalyst in (1) is in the range of from 0.1 to 1.5 ml/g, wherein the pore volume refers to the hydrogenation catalyst devoid of any compounds in its pores.

12. The process of any one of claims 1 to 11, wherein the weight ratio of the granular material to the unsaturated hydrocarbon feedstock in the mixture in (3) is in the range of from 1:99 to 40:60.

13. The process of any one of claims 1 to 12, wherein the weight ratio of the unsaturated hydrocarbon feedstock to the solvent system in the mixture in (3) is in the range of from 5:95 to 95:5.

14. The process of any one of claims 1 to 13, wherein for providing the hydrogenation catalyst in (1), the process comprises:

(i) providing an aqueous solution comprising one or more salts of one or more transition metals;

(ii) providing an aqueous solution comprising one or more bases;

(iii) providing an aqueous dispersion comprising one or more refractory metal oxides in water;

(iv) adding the aqueous solution provided in (i) and the aqueous solution provided in (ii) to the aqueous dispersion provided in (iii) for precipitating an oxide of the one or more transition metals;

(v) isolating the oxide particles obtained in (iv);

(vi) optionally washing and/or drying and/or calcining the oxide particles isolated in (v);

(vii) reducing the mixed oxide obtained in (v) or (vi) in a hydrogen atmosphere.

15. The process of any one of claims 1 to 14, wherein for providing the hydrogenation catalyst in (1), the process comprises:

(i) providing an aqueous solution comprising one or more salts of one or more transition metals;

(ii) providing an aqueous solution comprising one or more precursor salts of silica;

(iii) providing an aqueous solution comprising one or more precursor salts of alumina;

(iv) adding the aqueous solution provided in (i) and the aqueous solution provided in (ii) to the aqueous solution provided in (iii) for precipitating a mixed oxide;

(v) isolating the mixed oxide obtained in (iv);

(vi) optionally washing and/or drying and/or calcining the mixed oxide isolated in (v);

(vii) reducing the mixed oxide obtained in (v) or (vi) in a hydrogen atmosphere.