AMENDED CLAIMS

WE CLAIM:

1. Heterogeneous catalyst, comprising Pd and optionally a promoter, on a support, wherein:

the catalyst is coated with an ionic liquid (IL),

the BET surface area of the catalyst without the IL-coating is within a range of 1 to 9 m^2/g, and
the amount of ionic liquid relative to the total weight of the catalyst without ionic liquid is 0.1 - 10 wt%.

2. The catalyst as claimed in claim 1, wherein the promoter is selected from one or more of silver, gold, zinc, tin, lead, gallium, cadmium, bismuth, potassium and copper, and mixtures thereof.

3. The catalyst as claimed in claim 2, wherein the promoter is silver.

4. The catalyst as claimed in any one of claims 1 to 3, wherein the BET surface area is within a range of 2 to 8 m^2/g, preferably within a range of 3 to 5 m^2/g.

5. The catalyst as claimed in any one of claims 1 to 4, wherein the integral pore volume of the catalyst without the IL-coating is in the range of 0.005 to 0.07 ml/g, preferably in the range of 0.007 to 0.04 ml/g and more preferably in the range of 0.009 to 0.02 ml/g.

6. The catalyst as claimed in any one of claims 1 to 5, wherein the total weight of Pd relative to the total weight of the catalyst without the IL-coating is in the range of 10 to 1000 ppm, preferably in the range of 50 to 500 ppm.

7. The catalyst as claimed in any one of claims 1 to 6, wherein the weight ratio of palladium to promoter is in the range of 1:5 to 3:1, preferably in the range of 1:4 to 2:1, and more preferably in the range 1:3 to 1:1.

8. The catalyst as claimed in any one of claims 1 to 7, wherein the ionic liquid is a compound of formula (I):

$$[A]_n^+ \; [Y]^{n-} \qquad (I),$$

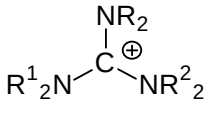
wherein:

n = 1 or 2;

$[Y]^{n-}$ is selected from the group consisting of tetrafluoroborate ($[BF_4]^-$), hexafluorophosphate ($[PF_6]^-$), dicyanamide ($[N(CN)_2]^-$), halides (Cl^-, Br^-, F^-, I^-), hexafluoroantimonate ($[SbF_6]^-$), nitrate ($[NO_3]^-$), nitrite ($[NO_2]^-$), anionic metal complexes such as $[CuCl_4]^{2-}$, $[PdCl_4]^{2-}$ or $[AuCl_4]^-$, acetate ($[CH_3COO]^-$), trifluoracetate ($[F_3CCOO]^-$), hexafluoroarsenate ($[AsF_6]^-$), sulfate ($[SO_4]^{2-}$), hydrogen sulfate ($[HSO_4]^-$), alkyl sulfates ($[R'\text{-}SO_4]^-$), tosylate ($[C_7H_7SO_3]^-$), triflate ($[CF_3SO_3]^-$), nonaflate ($[C_4F_9SO_3]^-$), triperfluoroethylene trifluorophosphate ($[PF_3(C_2F_5)_3]^-$), tricyanomethide ($[C(CN)_3]^-$), tetracyanoborate ($[B(CN)_4]^-$, thiocyanate ($[SCN]^-$), carbonate ($[CO_3]^{2-}$), carboxylates ($[R'\text{-}COO]^-$), sulfonates ($[R'SO_3]^-$), dialkylphosphates ($[R'PO_4R'']^-$), alkyl phosphonates ($[R'HPO_3]^-$) and bissulfonylimides ($[(R'\text{-}SO_2)_2N]^-$), such as bis(trifluormethylsulfonyl)imide,

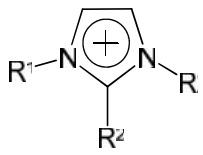
wherein R' and R" are the same or different, and each represents a linear or branched, 1 to 12 carbon atom-containing aliphatic or alicyclic alkyl group or a C_5-C_{18}-aryl, C_5-C_{18}-aryl-C_1-C_6-alkyl, or C_1-C_6-alkyl-C_5-C_{18}-aryl group that can be substituted with halogen atoms; and

$[A]^+$ is selected from the group consisting of quaternary ammonium cations with the formula $[NR^1R^2R^3R]^+$, phosphonium cations with the formula $[PR^1R^2R^3R]^+$, sulfonium cations with the formula $[SR^1R^2R]^+$, guadinium cations with the formula (II):



(II),

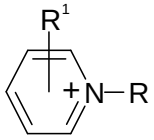
imidazolium cations with the formula (III)



(III),

wherein the imidazole core may additionally be substituted with one or more groups selected from C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-aminoalkyl, C_5-C_{12}-aryl, and C_5-C_{12}-aryl-C_1-C_6-alkyl groups,

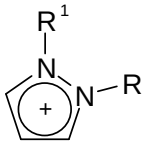
pyridinium cations with the formula (IV)



(IV),

wherein the pyridine core may additionally be substituted with one or more groups selected from C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-aminoalkyl, C_5-C_{12}-aryl, and C_5-C_{12}-aryl-C_1-C_6-alkyl groups,

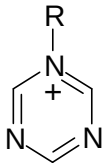
pyrazolium cations with the formula (V)



(V),

wherein the pyrazole core may additionally be substituted with one or more groups selected from C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-aminoalkyl, C_5-C_{12}-aryl, and C_5-C_{12}-aryl-C_1-C_6-alkyl groups,

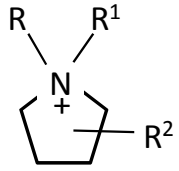
triazolium cations with the formula (VI)



(VI),

wherein the triazole core may additionally be substituted with one or more groups selected from C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-aminoalkyl, C_5-C_{12}-aryl, and C_5-C_{12}-aryl-C_1-C_6-alkyl groups,

and pyrrolidinium cations with the formula (VII)



(VII),

wherein the pyrrolidinium core may additionally be substituted with one or more groups selected from C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-aminoalkyl, C_5-C_{12}-aryl, and C_5-C_{12}-aryl-C_1-C_6-alkyl groups,

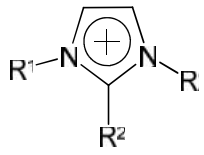
wherein R^1, R^2, and R^3 are selected independently from each other from the group consisting of: hydrogen; linear or branched, saturated or unsaturated, aliphatic or alicyclic alkyl groups with 1 to 20 carbon atoms, which may be interrupted by one or two of NH, O and/or S; heteroaryl groups with 3 to 8 carbon atoms and at least one hetero atom selected from N, O and S, wherein the heteroaryl groups can be substituted with one or more groups selected from C_1-C_6-alkyl groups and halogen atoms; heteroaryl-C_1-C_6-alkyl groups with 3 to 8 carbon atoms and at least one hetero atom selected from N, O and S in the heteroaryl moiety, wherein the heteroaryl moiety can be substituted with at least one group selected from C_1-C_6-alkyl groups and halogen atoms; polyethers with the formula $[-CH_2CH_2O]_nR^a$ with n = 1 to 50,000, wherein R^a is selected from the group consisting of linear or branched, saturated or unsaturated, aliphatic or alicyclic alkyl groups with 1 to 20 carbon atoms; aryl groups with 5 to 12 carbon atoms, which may be substituted with one or more C_1-C_6-alkyl groups and/or halogen atoms; aryl-C_1-C_6-alkyl groups with 5 to 12 carbon atoms in the aryl moiety, which may be substituted with one or more C_1-C_6-alkyl groups and/or halogen atoms, and

wherein R is selected from the group consisting of: linear or branched, saturated or unsaturated, aliphatic or alicyclic alkyl groups with 1 to 20 carbon atoms; heteroaryl-C_1-C_6-alkyl groups with 4 to 8 carbon atoms and at least one hetero atom selected from N, O and S in the heteroaryl moiety, which may be substituted with one or more C_1-C_6-alkyl groups and/or halogen atoms; and aryl-C_1-C_6-alkyl groups with 4 to 12 carbon atoms in the aryl moiety, which may be

substituted with one or more C_1-C_6-alkyl groups and/or halogen atoms.

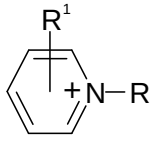
9. The catalyst as claimed in claim 8, wherein the ionic liquid is a compound of formula (I), wherein

$[A]^+$ is selected from the group consisting of quaternary ammonium cations with the formula $[NR^1R^2R^3R]^+$, imidazolium cations with the formula (III)



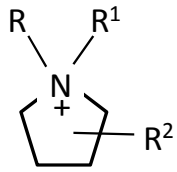
(III),

pyridinium cations with the formula (IV)



(IV),

and pyrrolidinium cations with the formula (VII)



(VII),

wherein R, R^1, R^2 and R^3 are selected independently from each other from the group consisting of hydrogen; linear or branched C_1-C_{12}-alkyl groups; linear or branched (C_1-C_6-alkyloxy)-C_1-C_6-alkyl groups; and aryl-C_1-C_6-alkyl groups with 5 to 12 carbon atoms in the aryl moiety, which may be substituted with one or more C_1-C_6-alkyl groups and/or halogen atoms.

10. The catalyst as claimed in claim 9, wherein the ionic liquid is a compound of formula (I), wherein

$[A]^+$ is selected from the group consisting 1-butyl-3-methylimidazolium, 1-ethyl-3-methylpyridinium, 1-butyl-1-methylpyrrolidinium, 1-butyl-2,3-dimethylimidazolium, 1-ethyl-3-methylimidazolium, 1-methyl-3-octylimidazolium triflate, ethyldimethyl-(2-methoxyethyl)ammonium, tributylmethylammonium, and tricyclohexyltetradecylphosphonium; and

$[Y]^{n-}$ is selected from the group consisting of triflate, ethylsulfate, tricyanomethane, methylsulfate, octylsulfate, tetrafluoroborate, methylphosphonate, bis(trifluoromethylsufonyl)imide, tetracyanoborate, tris(pentafluoroethyl)trifluorophosphate, and dicyanamide.

11. The catalyst as claimed in claim 9 or 10, wherein the ionic liquid is selected from 1-butyl-3-methylimidazolium triflate, 1-ethyl-3-methylpyridinium ethylsulfate, 1-butyl-1-methylpyrrolidinium triflate, 1-butyl-2,3-dimethylimidazolium triflate, 1-butyl-3-methylimidazolium tricyanomethane, 1-butyl-3-methylimidazolium methylsulfate, 1-butyl-3-methylimidazolium octylsulfate, 1-butyl-3-methylimidazolium tetrafluoroborate, 1-ethyl-3-methylimidazolium ethylsulfate, 1-ethyl-3-methylimidazolium methylphosphonate, 1-ethyl-3-methylimidazolium triflate, 1-butyl-1-methylpyrrolidinium bis(trifluoromethylsufonyl)imide, 1-butyl-1-methylpyrrolidinium tetracyanoborate, 1-butyl-1-methylpyrrolidinium tris(pentafluoroethyl)trifluorophosphate, 1-butyl-3-methylimidazolium bis(trifluoromethylsufonyl)imide, 1-butyl-3-methylimidazolium tricyanomethane, 1-ethyl-3-methylpyridinium bis(trifluoromethylsufonyl)imide, 1-ethyl-3-methylimidazolium tetracyanoborate, 1-ethyl-3-methylimidazolium tris(pentafluoroethyl)trifluorophosphate, 1-ethyl-3-methylpyridinium bis(trifluoromethylsufonyl)imide, 1-methyl-3-octylimidazolium triflate, ethyldimethyl-(2-methoxyethyl)ammonium tris(pentafluoroethyl)trifluorophosphate, tributylmethylammonium dicyanamide, tricyclohexyltetradecylphosphonium tris(pentafluoroethyl)trifluorophosphate, 1-ethyl-3-methylimidazolium bis(trifluoromethylsufonyl)imide, and mixtures thereof.

12. The catalyst as claimed in any one of claims 1 to 11, wherein the amount of ionic liquid relative to the total weight of the catalyst without ionic liquid is 0.2 – 3 wt%, preferably 0.3 – 1.5 wt%.

13. A method for preparing a catalyst composition as claimed in any one of claims 1 to 12, comprising the steps

a) providing a heterogenous catalyst, comprising Pd and optionally a promoter, on a support, having a BET surface area of less than or equal to 9 m^2/g,

b) coating of the catalyst with a mixture of ionic liquid and solvent, and

c) removing the solvent during or after coating the catalyst.

14. The method as claimed in Claim 13, comprising the additional step of reducing the heterogeneous catalyst prior to step b) or after step c).

15. The method as claimed in Claim 13 or 14, wherein the coating step b) is carried out by fluidized bed coating or by a coating through impregnation with a solution or suspension.

16. A method of selective hydrogenation of acetylene, preferably in front-end mixed olefin feed streems, comprising catalyzing said hydrogenation with a catalyst as claimed in any one of the Claims 1 to 12.

DATED this 12TH day of APRIL, 2014

DR. (MRS.) I. BANERJEE
OF L. S. DAVAR & CO.
Applicants' Agent – IN/PA - 211

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WE CLAIM:

1. Heterogeneous catalyst, comprising Pd and optionally a promoter, on a support, wherein:

the catalyst is coated with an ionic liquid (IL), ~~and~~

the BET surface area of the catalyst without the IL-coating is within a range of 1~~less than or equal~~ to 9 m^2/g, and
the amount of ionic liquid relative to the total weight of the catalyst without ionic liquid is 0.1 - 10 wt%.

2. The catalyst as claimed in~~according to~~ claim 1, wherein the promoter is selected from one or more of silver, gold, zinc, tin, lead, gallium, cadmium, bismuth, potassium and copper, and mixtures thereof.

3. The catalyst as claimed in~~according to~~ claim 2, wherein the promoter is silver.

4. The catalyst as claimed in~~according to~~ any one of claims 1 to 3, wherein the BET surface area is within a range of ~~1 to 9 m^2/g, preferably within a range of~~ 2 to 8 m^2/g, ~~and most~~ preferably within a range of 3 to 5 m^2/g.

5. The catalyst as claimed in~~according to~~ any one of claims 1 to 4, wherein the integral pore volume of the catalyst without the IL-coating is in the range of 0.005 to 0.07 ml/g, preferably in the range of 0.007 to 0.04 ml/g and more preferably in the range of 0.009 to 0.02 ml/g.

6. The catalyst as claimed in~~according to~~ any one of claims 1 to 5, wherein the total weight of Pd relative to the total weight of the catalyst without the IL-coating is in the range of 10 to 1000 ppm, preferably in the range of 50 to 500 ppm.

7. The catalyst as claimed in~~according to~~ any one of claims 1 to 6, wherein the weight ratio of palladium to promoter is in the range of 1:5 to 3:1, preferably in the range of 1:4 to 2:1, and more preferably in the range 1:3 to 1:1.

8. The catalyst as claimed in ~~according to~~ any one of claims 1 to 7, wherein the ionic liquid is a compound of formula (I):

$$[A]_n^+ \ [Y]^{n-} \qquad (I),$$

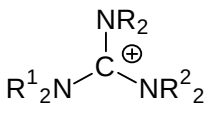
wherein:

n = 1 or 2;

$[Y]^{n-}$ is selected from the group consisting of tetrafluoroborate ($[BF_4]^-$), hexafluorophosphate ($[PF_6]^-$), dicyanamide ($[N(CN)_2]^-$), halides (Cl^-, Br^-, F^-, I^-), hexafluoroantimonate ($[SbF_6]^-$), nitrate ($[NO_3]^-$), nitrite ($[NO_2]^-$), anionic metal complexes such as $[CuCl_4]^{2-}$, $[PdCl_4]^{2-}$ or $[AuCl_4]^-$, acetate ($[CH_3COO]^-$), trifluoracetate ($[F_3CCOO]^-$), hexafluoroarsenate ($[AsF_6]^-$), sulfate ($[SO_4]^{2-}$), hydrogen sulfate ($[HSO_4]^-$), alkyl sulfates ($[R'\text{-}SO_4]^-$), tosylate ($[C_7H_7SO_3]^-$), triflate ($[CF_3SO_3]^-$), nonaflate ($[C_4F_9SO_3]^-$), triperfluoroethylene trifluorophosphate ($[PF_3(C_2F_5)_3]^-$), tricyanomethide ($[C(CN)_3]^-$), tetracyanoborate ($[B(CN)_4]^-$, thiocyanate ($[SCN]^-$), carbonate ($[CO_3]^{2-}$), carboxylates ($[R'\text{-}COO]^-$), sulfonates ($[R'SO_3]^-$), dialkylphosphates ($[R'PO_4R"]^-$), alkyl phosphonates ($[R'HPO_3]^-$) and bissulfonylimides ($[(R'\text{-}SO_2)_2N]^-$), such as bis(trifluormethylsulfonyl)imide,

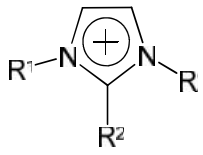
wherein R' and R" are the same or different, and each represents a linear or branched, 1 to 12 carbon atom-containing aliphatic or alicyclic alkyl group or a C_5-C_{18}-aryl, C_5-C_{18}-aryl-C_1-C_6-alkyl, or C_1-C_6-alkyl-C_5-C_{18}-aryl group that can be substituted with halogen atoms; and

$[A]^+$ is selected from the group consisting of quaternary ammonium cations with the formula $[NR^1R^2R^3R]^+$, phosphonium cations with the formula $[PR^1R^2R^3R]^+$, sulfonium cations with the formula $[SR^1R^2R]^+$, guadinium cations with the formula (II):



(II),

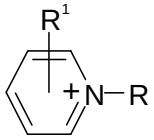
imidazolium cations with the formula (III)



(III),

wherein the imidazole core may additionally be substituted with one or more groups selected from C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-aminoalkyl, C_5-C_{12}-aryl, and C_5-C_{12}-aryl-C_1-C_6-alkyl groups,

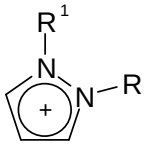
pyridinium cations with the formula (IV)



(IV),

wherein the pyridine core may additionally be substituted with one or more groups selected from C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-aminoalkyl, C_5-C_{12}-aryl, and C_5-C_{12}-aryl-C_1-C_6-alkyl groups,

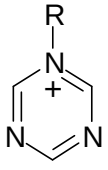
pyrazolium cations with the formula (V)



(V),

wherein the pyrazole core may additionally be substituted with one or more groups selected from C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-aminoalkyl, C_5-C_{12}-aryl, and C_5-C_{12}-aryl-C_1-C_6-alkyl groups,

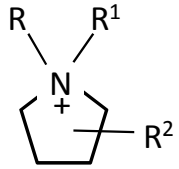
triazolium cations with the formula (VI)



(VI),

wherein the triazole core may additionally be substituted with one or more groups selected from C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-aminoalkyl, C_5-C_{12}-aryl, and C_5-C_{12}-aryl-C_1-C_6-alkyl groups,

and pyrrolidinium cations with the formula (VII)



(VII),

wherein the pyrrolidinium core may additionally be substituted with one or more groups selected from C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-aminoalkyl, C_5-C_{12}-aryl, and C_5-C_{12}-aryl-C_1-C_6-alkyl groups,

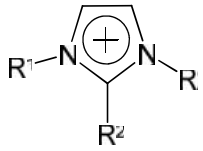
wherein R^1, R^2, and R^3 are selected independently from each other from the group consisting of: hydrogen; linear or branched, saturated or unsaturated, aliphatic or alicyclic alkyl groups with 1 to 20 carbon atoms, which may be interrupted by one or two of NH, O and/or S; heteroaryl groups with 3 to 8 carbon atoms and at least one hetero atom selected from N, O and S, wherein the heteroaryl groups can be substituted with one or more groups selected from C_1-C_6-alkyl groups and halogen atoms; heteroaryl-C_1-C_6-alkyl groups with 3 to 8 carbon atoms and at least one hetero atom selected from N, O and S in the heteroaryl moiety, wherein the heteroaryl moiety can be substituted with at least one group selected from C_1-C_6-alkyl groups and halogen atoms; polyethers with the formula $[-CH_2CH_2O]_nR^a$ with n = 1 to 50,000, wherein R^a is selected from the group consisting of linear or branched, saturated or unsaturated, aliphatic or alicyclic alkyl groups with 1 to 20 carbon atoms; aryl groups with 5 to 12 carbon atoms, which may be substituted with one or more C_1-C_6-alkyl groups and/or halogen atoms; aryl-C_1-C_6-alkyl groups with 5 to 12 carbon atoms in the aryl moiety, which may be substituted with one or more C_1-C_6-alkyl groups and/or halogen atoms, and

wherein R is selected from the group consisting of: linear or branched, saturated or unsaturated, aliphatic or alicyclic alkyl groups with 1 to 20 carbon atoms; heteroaryl-C_1-C_6-alkyl groups with 4 to 8 carbon atoms and at least one hetero atom selected from N, O and S in the heteroaryl moiety, which may be

substituted with one or more C_1-C_6-alkyl groups and/or halogen atoms; and aryl-C_1-C_6-alkyl groups with 4 to 12 carbon atoms in the aryl moiety, which may be substituted with one or more C_1-C_6-alkyl groups and/or halogen atoms.

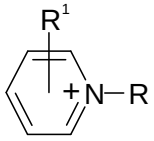
9. The catalyst as claimed in ~~according to~~ claim 8, wherein the ionic liquid is a compound of formula (I), wherein

$[A]^+$ is selected from the group consisting of quaternary ammonium cations with the formula $[NR^1R^2R^3R]^+$, imidazolium cations with the formula (III)



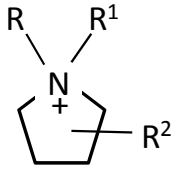
(III),

pyridinium cations with the formula (IV)



(IV),

and pyrrolidinium cations with the formula (VII)



(VII),

wherein R, R^1, R^2 and R^3 are selected independently from each other from the group consisting of hydrogen; linear or branched C_1-C_{12}-alkyl groups; linear or branched (C_1-C_6-alkyloxy)-C_1-C_6-alkyl groups; and aryl-C_1-C_6-alkyl groups with 5 to 12 carbon atoms in the aryl moiety, which may be substituted with one or more C_1-C_6-alkyl groups and/or halogen atoms.

10. The catalyst as claimed in ~~according to~~ claim 9, wherein the ionic liquid is a compound of formula (I), wherein

$[A]^+$ is selected from the group consisting 1-butyl-3-methylimidazolium, 1-ethyl-3-methylpyridinium, 1-butyl-1-methylpyrrolidinium, 1-butyl-2,3-dimethylimidazolium, 1-ethyl-3-methylimidazolium, 1-methyl-3-octylimidazolium triflate, ethyldimethyl-(2-methoxyethyl)ammonium, tributylmethylammonium, and tricyclohexyltetradecylphosphonium; and

$[Y]^{n-}$ is selected from the group consisting of triflate, ethylsulfate, tricyanomethane, methylsulfate, octylsulfate, tetrafluoroborate, methylphosphonate, bis(trifluoromethylsufonyl)imide, tetracyanoborate, tris(pentafluoroethyl)trifluorophosphate, and dicyanamide.

11. The catalyst as claimed in ~~according to~~ claim 9 or 10, wherein the ionic liquid is selected from 1-butyl-3-methylimidazolium triflate, 1-ethyl-3-methylpyridinium ethylsulfate, 1-butyl-1-methylpyrrolidinium triflate, 1-butyl-2,3-dimethylimidazolium triflate, 1-butyl-3-methylimidazolium tricyanomethane, 1-butyl-3-methylimidazolium methylsulfate, 1-butyl-3-methylimidazolium octylsulfate, 1-butyl-3-methylimidazolium tetrafluoroborate, 1-ethyl-3-methylimidazolium ethylsulfate, 1-ethyl-3-methylimidazolium methylphosphonate, 1-ethyl-3-methylimidazolium triflate, 1-butyl-1-methylpyrrolidinium bis(trifluoromethylsufonyl)imide, 1-butyl-1-methylpyrrolidinium tetracyanoborate, 1-butyl-1-methylpyrrolidinium tris(pentafluoroethyl)trifluorophosphate, 1-butyl-3-methylimidazolium bis(trifluoromethylsufonyl)imide, 1-butyl-3-methylimidazolium tricyanomethane, 1-ethyl-3-methylpyridinium bis(trifluoromethylsufonyl)imide, 1-ethyl-3-methylimidazolium tetracyanoborate, 1-ethyl-3-methylimidazolium tris(pentafluoroethyl)trifluorophosphate, 1-ethyl-3-methylpyridinium bis(trifluoromethylsufonyl)imide, 1-methyl-3-octylimidazolium triflate, ethyldimethyl-(2-methoxyethyl)ammonium tris(pentafluoroethyl)trifluorophosphate, tributylmethylammonium dicyanamide, tricyclohexyltetradecylphosphonium tris(pentafluoroethyl)trifluorophosphate, 1-ethyl-3-methylimidazolium bis(trifluoromethylsufonyl)imide, and mixtures thereof.

12. The catalyst as claimed in~~according to~~ any one of claims 1 to 11, wherein the amount of ionic liquid relative to the total weight of the catalyst without ionic liquid is ~~0.1 - 10 wt%, preferably~~ 0.2 – 3 wt%, ~~and most~~ preferably 0.3 – 1.5 wt%.

13. A method for preparing a catalyst composition as claimed in~~according to~~ any one of claims 1 to 12, comprising the steps

a) providing a heterogenous catalyst, comprising Pd and optionally a promoter, on a support, having a BET surface area of less than or equal to 9 m^2/g,

b) coating of the catalyst with a mixture of ionic liquid and solvent, and

c) removing the solvent during or after coating the catalyst.

14. The method as claimed in~~according to~~ Claim 13, comprising the additional step of reducing the heterogeneous catalyst prior to step b) or after step c).

15. The method as claimed in~~according to~~ Claim 13 or 14, wherein the coating step b) is carried out by fluidized bed coating or by a coating through impregnation with a solution or suspension.

~~16. Use of a catalyst as claimed inaccording to any one of the Claims 1 to 12 in the selective hydrogenation of acetylene, preferably in the gas phase or in the liquid phase.~~

16~~17~~. A method of selective hydrogenation of acetylene, preferably in front-end mixed olefin feed streems, comprising catalyzing said hydrogenation with a catalyst as claimed in~~according to~~ any one of the Claims 1 to 12.

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