Claims

1. A process for the catalytic hydrogenation of an aromatic or heteroaromatic nitro compound to the corresponding amine in the presence of a platinum catalyst comprising elemental platinum on a support, characterized in that the platinum catalyst has been modified with a molybdenum compound and a phosphorus compound wherein the phosphorus has an oxidation state of less than +5.

2. The process of claim 1, wherein the phosphorus compound is hypophosphorous acid or a salt or reaction product thereof.

3. The process of claim 1 or 2, wherein the molybdenum compound is an ortho-molybdate or reaction product thereof.

4. The process of claim 3, wherein the molybdenum compound is ammonium ortho-molybdate or zinc orthomolybdate or a reaction product thereof.

5. The process of any one of claims 1 to 4, wherein the support is charcoal.

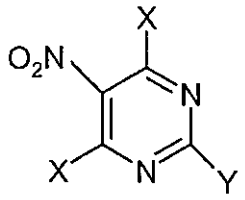
6. The process of any one of claims 1 to 5, wherein the catalyst has a molybdenum/platinum molar ratio of 1:1 to 100:1 and a phosphorus/molybdenum molar ratio of 1:1 to 100:1.

7. The process of claim 6, wherein the catalyst has a molybdenum/platinum molar ratio of 1:1 to 10:1 and a phosphorus/molybdenum molar ratio of 1:1 to 10:1.

8. The process of any one of claims 1 to 7 wherein the aromatic or heteroaromatic nitro compound is substituted with one or more substituents selected from the group consisting of halogen atoms and oxygen-containing or sulfur-containing groups.

9. The process of any one of claims 1 to 8 wherein the heteroaromatic nitro compound is a nitropyrimidine.

10. The process of any one of claims 1 to 9 wherein the heteroaromatic nitro compound is a compound of formula (II)



(II)

wherein X is halogen; Y is ZR^1; Z is oxygen or sulphur; and R^1 is C_{1-6} alkyl, C_{1-6} haloalkyl or C_{3-7} cycloalkyl.

11. The process of claim 10 wherein the heteroaromatic nitro compound is 4,6-dichloro-5-nitro-2-(propylsulfanyl)pyrimidine.

12. A modified supported platinum catalyst containing molybdenum and a phosphorus compound, wherein the phosphorus has an oxidation state of less than +5, obtainable by treating a supported platinum catalyst with an aqueous solution of hypophosphorous acid or a salt thereof and an orthomolybdate in a molybdenum/platinum molar ratio of 1:1 to 100:1 and a phosphorus/molybdenum molar ratio of 1:1 to 100:1.

13. The modified supported platinum catalyst of claim 12, wherein the molybdenum/platinum molar ratio is from 1:1 to 10:1 and the phosphorus/molybdenum molar ratio is from 1:1 to 10:1.

14. The modified supported platinum catalyst of claim 12 or 13, wherein the orthomolybdate is selected from ammonium orthomolybdate and zinc orthomolybdate.

Claims

1. A process for hydrogenating an aromatic or heteroaromatic nitro compound to the corresponding amine comprising:

hydrogenating the aromatic or heteroaromatic nitro compound with a platinum catalyst, wherein the platinum catalyst comprises elemental platinum on a support, wherein the platinum catalyst has been modified with a molybdenum compound and a phosphorus compound, wherein the phosphorus has an oxidation state of less than +5.

2. The process of claim **1** wherein the phosphorus compound is hypophosphorous acid or a salt, or reaction product thereof.

3. The process of claim **1** wherein the molybdenum compound is an orthomolybdate or reaction product thereof.

4. The process of claim **3** wherein the molybdenum compound is ammonium orthomolybdate or zinc orthomolybdate, or a reaction product thereof.

5. The process of claim **1** wherein the support is charcoal.

6. The process of claim **1** wherein the catalyst has a molybdenum/platinum molar ratio of 1:1 to 100:1 and a phosphorus/molybdenum molar ratio of 1:1 to 100:1.

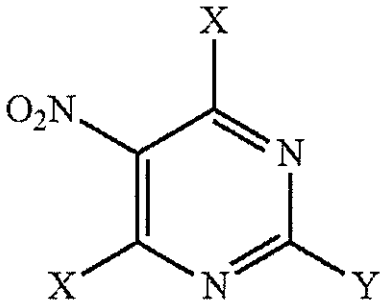
7. The process of claim **6** wherein the catalyst has a molybdenum/platinum molar ratio of 1:1 to 10:1 and a phosphorus/molybdenum molar ratio of 1:1 to 10:1.

8. The process of claim **1** wherein the aromatic or heteroaromatic nitro compound is substituted with one or more substituents chosen from halogen atoms and oxygen-containing or sulfur-containing groups.

9. The process of any claim **1** wherein the heteroaromatic nitro compound is a nitropyrimidine.

10. The process of claim **1** wherein the heteroaromatic nitro compound is a compound of formula (II)

(II)



wherein X is halogen; Y is ZR^1; Z is oxygen or sulphur; and R^1 is C_{1-6} alkyl, C_{1-6} haloalkyl or C_{3-7} cycloalkyl.

11. The process of claim **10** wherein the heteroaromatic nitro compound is 4,6-dichloro-5-nitro-2-(propylsulfanyl) pyrimidine.

12. A modified supported platinum catalyst comprising molybdenum and a phosphorus compound, wherein the phosphorus has an oxidation state of less than +5, obtainable by treating a supported platinum catalyst with an aqueous solution of hypophosphorous acid or a salt thereof and an orthomolybdate in a molybdenum/platinum molar ratio of 1:1 to 100:1 and a phosphorus/molybdenum molar ratio of 1:1 to 100:1.

13. The modified supported platinum catalyst of claim **12** wherein the molybdenum/platinum molar ratio is from 1:1 to 10:1 and the phosphorus/molybdenum molar ratio is from 1:1 to 10:1.

14. The modified supported platinum catalyst of claim **12** wherein the orthomolybdate is selected from ammonium orthomolybdate and zinc orthomolybdate.