Claims

1. Process comprising the following process steps:

a) introducing a first alcohol, the first alcohol having 2 to 30 carbon atoms;

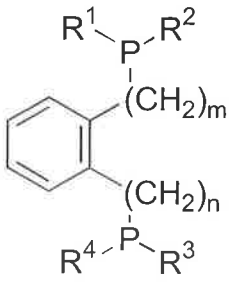
b) adding a phosphine ligand and a compound which comprises Pd, or adding a complex comprising Pd and a phosphine ligand;

c) adding a second alcohol;

d) supplying CO;

e) heating the reaction mixture, the first alcohol reacting with CO and the second alcohol to form an ester;

where the phosphine ligand is a compound of formula (**I**)



(**I**)

where

m and n are each independently 0 or 1;

R^1, R^2, R^3, R^4 are each independently selected from -(C_1-C_{12})-alkyl, -(C_3-C_{12})-cycloalkyl, -(C_3-C_{12})-heterocycloalkyl, -(C_6-C_{20})-aryl, -(C_3-C_{20})-heteroaryl;

at least one of the R^1, R^2, R^3, R^4 radicals is a -(C_3-C_{20})-heteroaryl radical;

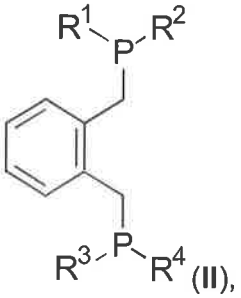
R^1, R^2, R^3, R^4, if they are -(C_1-C_{12})-alkyl, -(C_3-C_{12})-cycloalkyl, -(C_3-C_{12})-heterocycloalkyl, -(C_6-C_{20})-aryl or -(C_3-C_{20})-heteroaryl,

may each independently be substituted by one or more substituents selected from -(C_1-C_{12})-alkyl, -(C_3-C_{12})-cycloalkyl, -(C_3-C_{12})-heterocycloalkyl, -O-(C_1-C_{12})-alkyl, -O-(C_1-C_{12})-alkyl-(C_6-C_{20})-aryl, -O-(C_3-C_{12})-cycloalkyl, -S-(C_1-C_{12})-alkyl, -S-(C_3-C_{12})-cycloalkyl, -COO-(C_1-C_{12})-alkyl, -COO-(C_3-C_{12})-cycloalkyl, -CONH-(C_1-C_{12})-alkyl, -CONH-(C_3-C_{12})-cycloalkyl, -CO-(C_1-C_{12})-alkyl, -CO-(C_3-C_{12})-cycloalkyl, -N-[(C_1-C_{12})-alkyl]$_2$, -(C_6-C_{20})-aryl, -(C_6-C_{20})-aryl-(C_1-C_{12})-alkyl, -(C_6-C_{20})-aryl-O-(C_1-C_{12})-alkyl, -(C_3-C_{20})-heteroaryl, -(C_3-C_{20})-heteroaryl-(C_1-C_{12})-alkyl, -(C_3-C_{20})-heteroaryl-O-(C_1-C_{12})-alkyl, -COOH, -OH, -SO_3H, -NH_2, halogen;

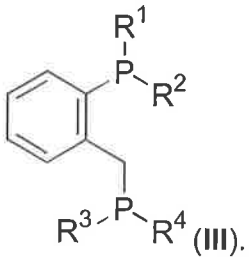
and further where

the -(C_3-C_{12})-heterocycloalkyl comprises non-aromatic, saturated or partly unsaturated cycloaliphatic groups having 3 to 12 carbon atoms, where one or more of the ring carbon atoms of the cycloaliphatic groups are replaced by heteroatoms.

2. Process according to Claim 1,
where the phosphine ligand is a compound of one of the formulae (**II**) and (**III**)



(**II**),



(**III**).

3. Process according to either of Claims 1 and 2,
where at least two of the R^1, R^2, R^3, R^4 radicals are a -(C_3-C_{20})-heteroaryl radical.

4. Process according to any of Claims 1 to 3,
where the R^1 and R^3 radicals are each a -(C_3-C_{20})-heteroaryl radical.

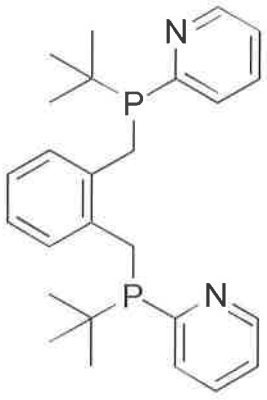
5. Process according to any of Claims 1 to 4,
where the R^1 and R^3 radicals are each a -(C_3-C_{20})-heteroaryl radical;
and R^2 and R^4 are each independently selected from -(C_1-C_{12})-alkyl, -(C_3-C_{12})-cycloalkyl, -(C_3-C_{12})-heterocycloalkyl, -(C_6-C_{20})-aryl.

6. Process according to any of Claims 1 to 5,
where the R^1 and R^3 radicals are each a -(C_3-C_{20})-heteroaryl radical;
and R^2 and R^4 are each independently selected from -(C_1-C_{12})-alkyl.

7. Process according to any of Claims 1 to 6,

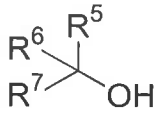
where R^1, R^2, R^3, R^4, if they are a heteroaryl radical, are each independently selected from furyl, thienyl, pyrrolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrazolyl, furazanyl, tetrazolyl, pyridyl, pyridazinyl, pyrimidyl, pyrazinyl, benzofuranyl, indolyl, isoindolyl, benzimidazolyl, quinolyl, isoquinolyl.

8. Process according to any of Claims 1 to 7,
where the phosphine ligand is a compound of formula (**1**)



(**1**).

9. Process according to any of Claims 1 to 8,
wherein the first alcohol in process step a) is a compound of formula (**IV**)



(**IV**)

where R^5 is selected from -(C_1-C_{12})-alkyl, -(C_3-C_{12})-cycloalkyl, -(C_6-C_{20})-aryl;
and R^6 and R^7 are each independently selected from -H, -(C_1-C_{12})-alkyl, -(C_3-C_{12})-cycloalkyl, -(C_6-C_{20})-aryl.

10. Process according to Claim 9,
wherein R^5 is -(C_1-C_{12})-alkyl.

11. Process according to any of Claims 9 to 10,
where R^6 and R^7 are each independently selected from -H, -(C_1-C_{12})-alkyl, -(C_6-C_{20})-aryl.

12. Process according to any of Claims 9 to 11,
wherein not more than one of the radicals R^6 and R^7 is -H.

13. Process according to any of Claims 1 to 12,
wherein the compound comprising Pd in process step b) is selected from palladium dichloride, palladium(II) acetylacetonate, palladium(II) acetate, dichloro(1,5-cyclooctadiene)palladium(II), bis(dibenzylideneacetone)palladium, bis(acetonitrile)dichloropalladium(II), palladium(cinnamyl) dichloride.

14. Process according to any of Claims 1 to 13,
wherein the second alcohol in process step c) is selected from methanol, ethanol, 1-propanol, 1-butanol, 1-pentanol, 1-hexanol, 2-propanol, *tert*-butanol, 3-pentanol, cyclohexanol, and mixtures thereof.

15. Process according to any of Claims 1 to 14,
wherein the first alcohol in process step a) is a secondary or tertiary alcohol and the second alcohol in process step c) is a primary alcohol.