We claim:

1. A method of carrying out an organic reaction in a solvent containing at least 90% by weight, in particular at least 97% by weight, based on the total weight of the solvent, of water, which method comprises reacting the reagents in said solvent in the presence of a cellulose derivative which is selected from the group consisting of cellulose modified with one or more alkylene oxides or other hydroxyalkyl precursors, and alkylcellulose;
where the organic reaction is not a polymerization or oligomerization reaction of olefinically unsaturated compounds.

2. The method as claimed in claim 1, where the cellulose derivative has a viscosity of from 1 to 150000 mPa·s, in particular 2 to 100000 mPa·s, specifically 2 to 10000 mPa·s, determined as a 2% by weight aqueous solution, relative to the weight of water.

3. The method as claimed in any of the preceding claims, where in the cellulose derivative 5 to 70%, in particular 10 to 60%, especially 15 to 50% of the hydrogen atoms in the hydroxyl groups of the cellulose on which the cellulose derivative is based are replaced by a hydroxyalkyl and/or alkyl group.

4. The method as claimed in any of the preceding claims, where the cellulose modified with one or more alkylene oxides or other hydroxyalkyl precursors is selected from the group consisting of hydroxyalkylcelluloses which are celluloses in which a part of the hydrogen atoms of the OH groups is replaced by a C_2-C_4-hydroxyalkyl group; hydroxyalkylalkylcelluloses which are celluloses in which a part of the hydrogen atoms of the OH groups is replaced by a C_2-C_4-hydroxyalkyl group and a part of the hydrogen atoms of the OH groups is replaced by a C_1-C_3-alkyl group; and alkylcelluloses which are celluloses in which a part of the hydrogen atoms of the OH groups is replaced by a C_1-C_3-alkyl group.

5. The method as claimed in any claim 4, where the cellulose derivative is selected from the group consisting of hydroxypropylmethylcellulose, hydroxypropylcellulose, hydroxyethylmethylcellulose, ethylhydroxyethylcellulose, hydroxyethylcellulose, methylcellulose and ethylcellulose, and in particular from hydroxypropylmethylcellulose, hydroxypropylcellulose, hydroxyethylmethylcellulose, ethylhydroxyethylcellulose and hydroxyethylcellulose.

6. The method as claimed in claim 5, where the cellulose derivative is hydroxypropylmethylcellulose.

7. The method as claimed in any of the preceding claims, where the cellulose derivative is used in an amount of from 0.01 to 15% by weight, in particular from 0.05 to 10% by weight, more particularly from 0.1 to 7% by weight, specifically from 0.2 to 5% by weight, based on the weight of the solvent, or, alternatively, based on the weight of water.

8. The method as claimed in any of the preceding claims, where the weight ratio of the cellulose derivative and all reagents is from 1:1 to 1:200, in particular from 1:1 to 1:100, more particularly from 1:2 to 1:70, specifically from 1:5 to 1:60.

9. The method as claimed in any of the preceding claims, where at least one of the reagents has a water solubility of at most 100 g per 1 l of water, in particular at most 50 g per 1 l of water, more particularly at most 10 g per 1 l of water, at 20 °C +/- 20 % and 101325 Pascal +/- 20 %.

10. The method as claimed in any of the preceding claims, where the organic reaction is a transition metal catalyzed reaction in which a transition metal catalyst is used.

11. The method as claimed in claim 10, where the transition metal catalyst is not a catalyst supported on the cellulose derivative.

12. The method as claimed in any of claims 10 and 11, where the transition metal is selected from the group consisting of Fe, Ru, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, and Zn and in particular from the group consisting of Ru, Rh, Ni, Pd, Pt, Cu and Au.

13. The method as claimed in any of claims 10 to 12, where the transition metal catalyzed reaction is
- a transition metal catalyzed C-C coupling reaction;
- a transition metal catalyzed reaction involving C-N bond formation;
- a transition metal catalyzed reaction involving C-O bond formation;
- a transition metal catalyzed reaction involving C-S bond formation;
- a transition metal catalyzed reaction involving C-B bond formation; or
- a transition metal catalyzed reaction involving C-halogen bond formation.

14. The method as claimed in claim 13, where the transition metal catalyzed C-C-coupling reaction is selected from the group consisting of the Suzuki-Miyaura reaction, Negishi coupling, Heck reaction, C-C coupling reactions involving C-H activation different from Heck reaction, Sonogashira coupling, Stille coupling, Grubbs olefin metathesis, 1,4 additions of organoborane compounds to α,β-olefinically unsaturated carbonyl compounds, in particular Rh-catalyzed 1,4-additions, Kumada coupling, Hiyama coupling, Ullmann reactions, Glaser coupling, inclusive the Eglinton and the Hay coupling, Cadiot-Chodkiewicz coupling, the Fukuyama coupling, hydroformylation and cyclopropanation, and in particular from the Suzuki-Miyaura reaction, Negishi coupling, Heck reaction, C-C coupling reactions involving C-H activation other than Heck reaction, Sonogashira coupling, Stille coupling, Grubbs olefin metathesis, 1,4 additions of organoborane compounds to α,β-olefinically unsaturated carbonyl compounds, in particular Rh-catalyzed 1,4-additions, and cyclopropanation.

15. The method as claimed in claim 14, where the transition metal catalyzed C-C-coupling reaction is a Suzuki-Miyaura reaction in which an organoboron

compound is reacted with an organic halogenide or sulfonate in the presence of a transition metal catalyst and optionally a base;

where the organoboron compound is a compound of formula R^1-BY_2, where R^1 is an alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, aryl or heteroaryl group and Y is an alkyl, O-alkyl or hydroxyl group, or the two substituents Y form together with the boron atom they are bound to a mono-, bi- or polycyclic ring; or the organoboron compound is a compound of formula R^1-BF_3M, where M is a metal equivalent; and

the organic halogenide or sulfonate is a compound of formula R^2-$(Z)_n$, where R^2 is an alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, aryl or heteroaryl group, Z is a halogenide or sulfonate group (the sulfonate being in particular a fluorinated alkylsulfonate or tosylate, specifically triflate or nonaflate), especially Cl, Br, I, triflate or nonaflate, and n is 1, 2, 3 or 4;

where the alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, aryl and heteroaryl groups R^1 and R^2 can carry one or more substituents.

16. The method as claimed in claim 14, where the transition metal catalyzed C-C-coupling reaction is a Sonogashira reaction, where an aryl, heteroaryl or vinyl halogenide or sulfonate is reacted with a terminal alkyne in the presence of a transition metal catalyst, optionally of a copper(I) salt, and optionally of a base;

where the aryl, heteroaryl or vinyl halogenide or sulfonate is a compound of formula R^2-$(Z)_n$, where R^2 is a terminal alkenyl, aryl or heteroaryl group, Z is a halogenide or sulfonate group (the sulfonate being in particular a fluorinated alkylsulfonate or tosylate, specifically triflate or nonaflate) and n is 1, 2, 3 or 4;

the terminal alkyne is a compound of formula H-C≡C-R^1, where R^1 is hydrogen or an alkyl, alkenyl, alkapolyenyl, alkynyl (provided that the alkyne group is not terminal), alkapolyynyl (provided there is no terminal alkyne group in this

radical), mixed alkenyl/alkynyl (provided there is no terminal alkyne group in this radical), cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl, heteroaryl or silyl group $Si(R^{14'})_3$,
where the alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, aryl, heterocyclyl and heteroaryl groups R^1 and R^2 can carry one or more substituents; and
where each $R^{14'}$ is independently selected from the group consisting of hydrogen, halogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxy-C_1-C_6-alkyl, C_1-C_6-haloalkoxy-C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-haloalkenyl, C_2-C_6-alkynyl, C_2-C_6-haloalkynyl, C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, and phenyl, optionally substituted with 1, 2, 3, 4, or 5 radicals selected from the group consisting of halogen, cyano, nitro, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy and C_1-C_6-haloalkoxy.

17. The method as claimed in claim 14, where the transition metal catalyzed C-C coupling reaction is a Heck reaction, where an aryl, heteroaryl, benzyl, vinyl or alkyl halogenide or sulfonate (the alkyl group must not contain any β-hydrogen atoms) is reacted with an olefinically unsaturated compound in the presence of a transition metal catalyst and optionally in the presence of a base;
where the aryl, heteroaryl, benzyl, vinyl or alkyl halogenide or sulfonate is a compound of the formula R^2-$(Z)_n$, where R^2 is an aryl, heteroaryl, benzyl, vinyl or alkyl group, where the alkyl group must not contain any β-hydrogen atoms, Z is a halogen atom or a sulfonate group (the sulfonate being in particular a fluorinated alkylsulfonate or tosylate, specifically triflate, nonaflate or tosylate), preferably a Cl, Br, I, triflate, nonaflate or tosylate group, and n is 1, 2, 3 or 4, and
the olefinically unsaturated compound is a compound of the formula $R^1(H)C=C(R^3)(R^4)$ where R^1, R^3, and R^4, independently of each other, are selected from the group consisting of hydrogen, alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkeny/alkynyl, halogen, cyano, nitro, azido, -SCN, $-SF_5$, OR^{11}, $S(O)_mR^{11}$, $NR^{12a}R^{12b}$, $C(=O)R^{13}$, $C(=S)R^{13}$, $C(=NR^{12a})R^{13}$, $-Si(R^{14})_3$, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl,

polycarbocyclyl, where the five last-mentioned substituents may carry one or more substituents R^{15}; aryl which may be substituted by one or more radicals R^{15}; heterocyclyl which may be substituted by one or more radicals R^{15}; and heteroaryl which may be substituted by one or more radicals R^{15}; where

each R^{11} is independently selected from the group consisting of hydrogen, cyano, alkyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, where the aliphatic and cycloaliphatic moieties in the 11 last-mentioned radicals may be partially or fully halogenated and/or may be substituted by one or more radicals R^{17}, -alkyl-$C(=O)OR^{18}$, -alkyl-$C(=O)N(R^{12a})R^{12b}$, -alkyl-$C(=S)N(R^{12a})R^{12b}$, -alkyl-$C(=NR^{12})N(R^{12a})R^{12b}$, $-Si(R^{14})_3$, $-S(O)_mR^{18}$, $-S(O)_mN(R^{12a})R^{12b}$, $-N(R^{12a})R^{12b}$, $-N=C(R^{16})_2$, $-C(=O)R^{13}$, $-C(=O)N(R^{12a})R^{12b}$, $-C(=S)N(R^{12a})R^{12b}$, $-C(=O)OR^{18}$, aryl, optionally substituted with one or more substituents R^{15}; heterocyclyl, optionally substituted with one or more substituents R^{15}; and heteroaryl, optionally substituted with one or more substituents R^{15}; and

R^{11} in the group $-S(O)_mR^{11}$ is additionally selected from the group consisting of alkoxy and haloalkoxy;

R^{12}, R^{12a} and R^{12b}, independently of each other and independently of each occurrence, are selected from the group consisting of hydrogen, cyano, alkyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, wherein the 11 last-mentioned aliphatic and cycloaliphatic radicals may be partially or fully halogenated and/or may be substituted by one or more, in particular 1, 2 or 3, specifically 1, substituents R^{19}, $-OR^{20}$, $-NR^{21a}R^{21b}$, $-S(O)_mR^{20}$, $-C(=O)N(R^{21a}R^{21b})$, $-C(=O)NR^{21}N(R^{21a}R^{21b})$, $-Si(R^{14})_3$, $-C(=O)R^{13}$, aryl which may be substituted with 1, 2, 3, 4, or 5, in particular 1, 2 or 3, specifically 1, substituents R^{15},

heterocyclyl which may be substituted with one or more, in particular 1, 2 or 3, specifically 1, substituents R^{15};and

heteroaryl which may be substituted with one or more, in particular 1, 2 or 3, specifically 1, substituents R^{15};

or R^{12a} and R^{12b}, together with the nitrogen atom to which they are bound, form a saturated, partially unsaturated or maximally unsaturated heterocyclic or heteroaromatic ring, where the ring may further contain 1, 2, 3 or 4 heteroatoms or heteroatom-containing groups selected from the group consisting of O, S, N, SO, SO_2, C=O and C=S as ring members, wherein the heterocyclic or heteroaromatic ring may be substituted with 1, 2, 3, 4 or 5, in particular 1, 2 or 3, specifically 1, substituents independently selected from R^{15};

or R^{12a} and R^{12b} together form a group $=C(R^{22})_2$, $=S(O)_m(R^{20})_2$, $=NR^{21a}$ or $=NOR^{20}$;

each R^{13} is independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, where the aliphatic and cycloaliphatic moieties in the 11 last-mentioned radicals may be partially or fully halogenated and/or may be substituted by one or more radicals R^{17}; aryl, optionally substituted with one or more radicals R^{15}; heterocyclyl, optionally substituted with one or more radicals R^{15}; heteroaryl, optionally substituted with one or more radicals R^{15}; OR^{20}, $-S(O)_mR^{20}$, $-N(R^{21a})R^{21b}$, $-C(=O)N(R^{21a})R^{21b}$, $-C(=S)N(R^{21a})R^{21b}$ and $-C(=O)OR^{20}$;

each R^{14} is independently selected from the group consisting of hydrogen, halogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxy-C_1-C_6-alkyl, C_1-C_6-haloalkoxy-C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-haloalkenyl, C_2-C_6-alkynyl, C_2-C_6-haloalkynyl, C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, and phenyl, optionally substituted with 1, 2, 3, 4, or 5 radicals R^{15};

each R^{15} is independently selected from the group consisting of halogen, azido, nitro, cyano, -OH, -SH, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio,

C_1-C_6-haloalkylthio, C_1-C_6-alkylsulfinyl, C_1-C_6-haloalkylsulfinyl, C_1-C_6-alkylsulfonyl, C_1-C_6-haloalkylsulfonyl, -$Si(R^{23})_3$;

C_1-C_{20}-alkyl, C_2-C_{20}-alkenyl, C_2-C_{20}-alkapolyenyl, C_2-C_{20}-alkynyl, C_2-C_{20}-alkapolyynyl, mixed C_2-C_{20}-alkenyl/alkynyl, wherein the six last-mentioned aliphatic radicals may be partially or fully halogenated and/or may carry one or more radicals selected from the group consisting of OH, C_1-C_{20}-alkoxy, C_1-C_{20}-haloalkoxy, SH, C_1-C_{20}-alkylthio, C_1-C_{20}-haloalkylthio, C_1-C_{20}-alkylsulfinyl, C_1-C_{20}-haloalkylsulfinyl, C_1-C_{20}-alkylsulfonyl, C_1-C_{20}-haloalkylsulfonyl, - $Si(R^{23})_3$, oxo, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, C_8-C_{20}-cycloalkynyl, mixed C_3-C_{20}-cycloalkenyl/cycloalkynyl, polycarbocyclyl, aryl, heterocyclyl and heteroaryl, wherein the 8 last-mentioned cyclic radicals may in turn be partially or fully halogenated and/or may carry one or more radicals selected from the group consisting of OH, C_1-C_{20}-alkoxy, C_1-C_{20}-haloalkoxy, SH, C_1-C_{20}-alkylthio, C_1-C_{20}-haloalkylthio, C_1-C_{20}-alkylsulfinyl, C_1-C_{20}-haloalkylsulfinyl, C_1-C_{20}-alkylsulfonyl, C_1-C_{20}-haloalkylsulfonyl, - $Si(R^{23})_3$, oxo, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_2-C_6-alkenyl, C_2-C_6-haloalkenyl, C_2-C_6-alkynyl, C_2-C_6-haloalkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, C_8-C_{20}-cycloalkynyl, mixed C_3-C_{20}-cycloalkenyl/cycloalkynyl, polycarbocyclyl, aryl, heterocyclyl and heteroaryl, wherein the 8 last mentioned radicals may in turn be unsubstituted, partially or fully halogenated and/or carry 1, 2 or 3 substituents selected from the group consisting of cyano, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl and C_1-C_6-haloalkoxycarbonyl;

C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, C_8-C_{20}-cycloalkynyl, mixed C_3-C_{20}-cycloalkenyl/cycloalkynyl, polycarbocyclyl, wherein the 5 last-mentioned cycloaliphatic radicals may be partially or fully halogenated and/or may carry one or more radicals selected from the group consisting of cyano, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy and oxo;

aryl, O-aryl, heterocyclyl, O-heterocyclyl, heteroaryl and O-heteroaryl, wherein the cyclic moieties in the 6 last mentioned radicals may be unsubstituted, partially or fully halogenated and/or carry 1, 2 or 3, in

particular 1, substituents selected from the group consisting of C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl and C_1-C_6-haloalkoxycarbonyl;

or

two R^{15} present together on the same atom of an unsaturated or partially unsaturated ring may be =O, =S, =N(C_1-C_6-alkyl), =NO(C_1-C_6-alkyl), =CH(C_1-C_4-alkyl) or =C(C_1-C_4-alkyl)C_1-C_4-alkyl;

or

two R^{15} on two adjacent carbon or nitrogen atoms form together with the carbon or nitrogen atoms they are bonded to a 4-, 5-, 6-, 7- or 8-membered saturated, partially unsaturated or maximally unsaturated, including heteroaromatic, ring, wherein the ring may contain 1, 2, 3 or 4 heteroatoms or heteroatom groups selected from the group consisting of N, O, S, NO, SO and SO_2, as ring members, and wherein the ring optionally carries one or more, in particular 1, 2 or 3, specifically 1, substituents selected from the group consisting of halogen, cyano, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy;

each R^{16} is independently selected from the group consisting of hydrogen, halogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_2-C_6-alkenyl, C_2-C_6-haloalkenyl, C_2-C_6-alkynyl and C_2-C_6-haloalkynyl, wherein the six last-mentioned aliphatic radicals may carry 1 or 2 radicals selected from the group consisting of CN, C_3-C_4-cycloalkyl, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy and oxo;

each R^{17} is independently selected from the group consisting of cyano, nitro, -OH, -SH, -SCN, -SF_5, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_1-C_6-haloalkylthio, C_1-C_6-alkylsulfinyl, C_1-C_6-haloalkylsulfinyl, C_1-C_6-alkylsulfonyl, C_1-C_6-haloalkylsulfonyl, -Si(R^{14})$_3$, C_3-C_8-cycloalkyl which may be unsubstituted, partially or fully halogenated and/or may carry 1 or 2 radicals selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy and oxo;

aryl, aryloxy, heterocyclyl, heterocyclyloxy, heteroaryl and heteroaryloxy, where the cyclic moiety in the 6 last-mentioned radicals may be unsubstituted, partially or fully halogenated and/or carry 1, 2, 3, 4 or 5 substituents R^{15}; or

two R^{17} present on the same carbon atom (of an alkyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl or mixed alkenyl/alkynyl group) may together be =O, =CH(C_1-C_4-alkyl), =C(C_1-C_4-alkyl)C_1-C_4-alkyl, =N(C_1-C_6-alkyl) or =NO(C_1-C_6-alkyl);

and

R^{17} as a substituent on a cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl or polycarbocyclyl ring is additionally selected from the group consisting of C_1-C_6-alkyl, C_2-C_6-alkenyl and C_2-C_6-alkynyl, wherein the three last-mentioned aliphatic radicals may be unsubstituted, partially or fully halogenated and/or may carry 1 or 2 substituents selected from the group consisting of CN, C_3-C_4-cycloalkyl, C_3-C_4-halocycloalkyl, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy and oxo;

each R^{18} is independently selected from the group consisting of hydrogen, cyano, -Si(R^{14})$_3$,

C_1-C_{20}-alkyl, C_2-C_{20}-alkenyl, C_2-C_{20}-alkynyl, wherein the three last-mentioned aliphatic radicals may be unsubstituted, partially or fully halogenated and/or may carry 1 or 2, in particular 1, radicals selected from the group consisting of C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, C_1-C_{20}-alkoxy, C_1-C_{20}-haloalkoxy, C_1-C_{20}-alkylthio, C_1-C_{20}-haloalkylthio, C_1-C_{20}-alkylsulfinyl, C_1-C_{20}-haloalkylsulfinyl, C_1-C_{20}-alkylsulfonyl, C_1-C_{20}-haloalkylsulfonyl and oxo;

C_3-C_8-cycloalkyl which may be unsubstituted, partially or fully halogenated and/or may carry 1 or 2, in particular 1, radicals selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_3-C_4-cycloalkyl, C_3-C_4-halocycloalkyl, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy, C_1-C_4-alkylthio, C_1-C_4-haloalkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-haloalkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkylsulfonyl and oxo;

aryl, heterocyclyl and heteroaryl, wherein the 3 last-mentioned radicals may be unsubstituted, partially or fully halogenated and/or carry 1, 2 or 3, in particular 1 or 2, specifically 1, substituents selected from the group consisting of C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl and C_1-C_6-haloalkoxycarbonyl; and

R^{18} in the group $S(O)_mR^{18}$ is additionally selected from the group consisting of C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, aryloxy, heterocyclyloxy and heteroaryloxy;

each R^{19} is independently selected from the group consisting of halogen, nitro, cyano, -OH, -SH, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_1-C_6-haloalkylthio, C_1-C_6-alkylsulfinyl, C_1-C_6-haloalkylsulfinyl, C_1-C_6-alkylsulfonyl, C_1-C_6-haloalkylsulfonyl, $Si(R^{14})_3$;

C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, wherein the two last-mentioned cycloaliphatic radicals may carry one or more radicals selected from the group consisting of cyano, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy and oxo;

aryl, aryloxy, heterocyclyl, heterocyclyloxy, heteroaryl and heteroaryloxy, wherein the 6 last mentioned radicals may be unsubstituted, partially or fully halogenated and/or carry 1, 2 or 3, in particular 1, substituents selected from the group consisting of C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl and C_1-C_6-haloalkoxycarbonyl;

each R^{20} is independently defined as R^{18};

R^{21}, R^{21a} and R^{21b}, independently of each other and independently of each occurrence, are selected from the group consisting of hydrogen, cyano, alkyl, cycloalkyl, alkenyl, alkynyl, wherein the four last-mentioned aliphatic and cycloaliphatic radicals may be partially or fully halogenated, aryl, aryl-C_1-C_4-alkyl, heterocyclyl, and heteroaryl, where the rings in the 4 last mentioned radicals may be substituted with 1, 2, 3, 4, or 5 substituents R^{15};

or R^{21a} and R^{21b}, together with the nitrogen atom to which they are bound, form a 3-, 4-, 5-, 6-, 7- or 8-membered saturated, partially unsaturated or maximally unsaturated heterocyclic, inclusive heteroaromatic, ring, where

the ring may further contain 1, 2, 3 or 4 heteroatoms or heteroatom-containing groups selected from the group consisting of O, S, N, SO, SO_2, C=O and C=S as ring members, wherein the heterocyclic ring may be substituted with 1, 2, 3, 4 or 5 substituents independently selected from R^{15};

each R^{22} is independently defined as R^{16};

each R^{23} is independently selected from the group consisting of hydrogen, halogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxy-C_1-C_6-alkyl, C_1-C_6-haloalkoxy-C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-haloalkenyl, C_2-C_6-alkynyl, C_2-C_6-haloalkynyl, C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, and phenyl, optionally substituted with 1, 2, 3, 4, or 5 radicals selected from the group consisting of halogen, cyano, nitro, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy and C_1-C_6-haloalkoxy; and

m is 0, 1 or 2;

where the alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl and mixed alkenyl/alkynyl groups R^1, R^3 and R^4, and the aryl, heteroaryl, benzyl, vinyl and alkyl groups R^2 can carry one or more substituents.

18. The method as claimed in claim 14, where the transition metal catalyzed C-C-coupling reaction is a C-C coupling reaction involving C-H activation in which an aromatic or heteroaromatic halogenide or sulfonate is coupled with an aromatic or heteroaromatic compound in the presence of a transition metal catalyst and in case that an aromatic or heteroaromatic chloride, bromide or iodide is used, optionally also in the presence of a water-soluble silver(I) salt;

where the aromatic or heteroaromatic halogenide or sulfonate is a compound of formula R^2-Z, where R^2 is an aryl or heteroaryl group, Z is a halogen atom (Cl, Br and I being preferred) or a sulfonate group (the sulfonate being in particular a fluorinated alkylsulfonate or tosylate, specifically triflate, nonaflate or tosylate), and

the aromatic or heteroaromatic is a compound of formula R^1-H, where R^1 is an aryl or heteroaryl group,

where the aryl and heteroaryl groups R^1 and R^2 can carry one or more substituents.

19. The method as claimed in claim 14, where the transition metal catalyzed C-C-coupling reaction is a Stille reaction, where an organotin compound (organostannane) is reacted with an alkenyl, aryl, heteroaryl or acyl halide, sulfonate or phosphate in the presence of a transition metal catalyst and optionally also in the presence of a base,
where the organostannane compound is a compound of the formula R^1-$Sn(R^a)_3$, where R^1 is a an alkenyl, aryl or heteroaryl group and R^a is an alkyl group, and the alkenyl, aryl, heteroaryl or acyl halide, sulfonate or phosphate is a compound of the formula R^2-$(Z)_n$, where R^2 is an alkenyl, aryl, heteroaryl or acyl group, Z is a halogen atom, a sulfonate group (the sulfonate being in particular a fluorinated alkylsulfonate or tosylate, specifically triflate or nonaflate) or a phosphate group, preferably a Cl, Br, I, triflate, nonaflate or phosphate group, and n is 1, 2, 3 or 4, where the alkenyl, aryl and heteroaryl groups R^1 and R^2 can carry one or more substituents.

20. The method as claimed in claim 14, where the transition metal catalyzed C-C-coupling reaction is a Negishi reaction.

21. The method as claimed in claim 14, where the transition metal catalyzed C-C-coupling reaction is a Grubbs olefin metathesis, where two olefinic compounds $R^1R^2C{=}CR^3R^4$ and $R^5R^6C{=}CR^7R^8$ are reacted with each other in the presence of a Grubbs catalyst,
where R^1, R^2, R^3, R^4, R^5, R^6, R^7 and R^8, independently of each other, are selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl, hetaryl, halogen, cyano, nitro, azido, -SCN, $-SF_5$, OR^{11}, $S(O)_mR^{11}$, $NR^{12a}R^{12b}$, $C(=O)R^{13}$, $C(=S)R^{13}$, $C(=NR^{12a})R^{13}$ and $-Si(R^{14})_3$; where R^{11}, R^{12a}, R^{12b}, R^{13} and R^{14} are independently as defined in claim 17;

where the alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl and heteroaryl groups R^1, R^2, R^3, R^4, R^5, R^6, R^7 and R^8 can carry one or more substituents.

22. The method as claimed in claim 14, where the transition metal catalyzed C-C coupling reaction is a 1,4-addition of an organoborane compound to an α,β-olefinically unsaturated carbonyl compound in the presence of a transition metal catalyst, especially a Rh catalysts,
where the organoboron compound is a compound of formula R^1-BY_2, where R^1 is an alkyl, alkenyl, alkynyl, aryl or heteroaryl group and Y is an alkyl, O-alkyl or hydroxyl group, or the two substituents Y form together with the boron atom they are bound to a mono-, bi- or polycyclic ring; or the organoboron compound is a compound of formula R^1-BF_3M, where M is a metal equivalent, and
the α,β-olefinically unsaturated carbonyl compound is a compound of formula $R^2R^3C=CR^4$-C(=O)-R^5, where R^2, R^3 and R^4, independently of each other, are hydrogen, alkyl, cycloalkyl, heterocyclyl, aryl or heteroaryl and R^5 is hydrogen, alkyl, cycloalkyl, aryl, heteroaryl, OH, SH, alkoxy, alkylthio, NH_2, alkylamino or dialkylamino,
where the alkyl (also as part of alkoxy, alkylthio, alkylamino or dialkylamino), alkenyl, alkynyl, cycloalkyl, heterocyclyl, aryl or heteroaryl groups R^1, R^2, R^3, R^4 and R^5 can carry one or more substituents.

23. The method as claimed in claim 14, where the transition metal catalyzed C-C-coupling reaction is a cyclopropanation, where an olefinically unsaturated compound is reacted with a diazo compound in the presence of a transition metal catalyst, where the olefinically unsaturated compound is a compound of formula $R^1R^2C=CR^3R^4$ and the diazo compound is a compound of formula $N_2=CR^5R^6$, where R^1, R^2, R^3, R^4, R^5 and R^6, independently of each other, are selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl, hetaryl, halogen, cyano, nitro, azido, -SCN, $-SF_5$, OR^{11},

$S(O)_mR^{11}$, $NR^{12a}R^{12b}$, $C(=O)R^{13}$, $C(=S)R^{13}$, $C(=NR^{12a})R^{13}$ and $-Si(R^{14})_3$; where R^{11}, R^{12a}, R^{12b}, R^{13} and R^{14} are independently as defined in claim 17;
where the alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl and heteroaryl groups R^1, R^2, R^3, R^4, R^5 and R^6 can carry one or more substituents.

24. The method as claimed in claim 13, where the transition metal catalyzed reaction is a transition metal catalyzed reaction involving C-N bond formation, where the transition metal catalyzed reaction involving C-N bond formation is a Buchwald-Hartwig reaction or an Au-catalyzed cyclodehydratization of α,β-amino alcohols containing a C-C triple bond.

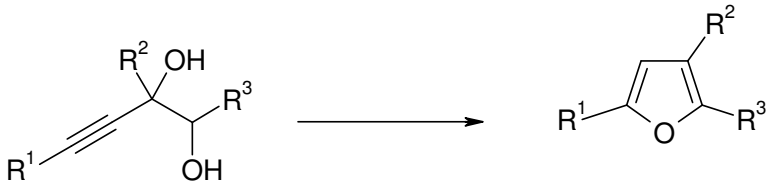
25. The method as claimed in claim 24, where the transition metal catalyzed reaction involving C-N bond formation is a Buchwald-Hartwig reaction in which an aryl or heteroaryl halogenide or sulfonate is reacted with a primary or secondary amine, carboxamide, sulfonamide, imide, urea or urethane in the presence of a transition metal catalyst and optionally also of base,
where the aryl or heteroaryl halogenide or sulfonate is a compound of the formula R^2-$(Z)_n$, where R^2 is an aryl or heteroaryl group, Z is a halogen atom or a sulfonate group (the sulfonate being in particular a fluorinated alkylsulfonate or tosylate, specifically triflate or nonaflate) and n is 1, 2, 3 or 4, and
the primary or secondary amine, carboxamide, sulfonamide, imide, urea or urethane is a compound of the formula H-N(R^1)R^3, where R^1 is H, alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, aryl, heterocyclyl, heteroaryl or R^4-C(O)-, and R^3 is H, alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, aryl, heterocyclyl, heteroaryl, R^4-C(O)-, R^4-$S(O)_2$-, R^4-O-C(O)- or $R^5(R^4)$N-C(O)-, where R^4 and R^5 are independently of each other H, alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, aryl, heterocyclyl or heteroaryl, or R^4

and R^5 in the group $R^5(R^4)N$-C(O)- form together with the nitrogen atom they are bound to a mono- bi- or polycyclic heterocyclic ring; or R^1 and R^3 form together with the nitrogen atom they are bound to a mono-, bi- or polycyclic heterocyclic ring;

where the alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl or heteroaryl groups R^1, R^2, R^3, R^4, and R^5 can carry one or more substituents.

26. The method as claimed in claim 13, where the transition metal catalyzed reaction is a transition metal catalyzed reaction involving C-O bond formation, where the transition metal catalyzed reaction involving C-O bond formation is an Au-catalyzed cyclodehydratization of alkyne diols, an Au-catalyzed cyclization of alkynenols, an Au-catalyzed cyclization of alkynones, an Au-catalyzed cyclization of allenones, or is the formation of alcohols or ethers via C-O coupling.

27. The method as claimed in claim 26, where the transition metal catalyzed reaction involving C-O bond formation is an Au-catalyzed cyclodehydratization of alkyne diols, in particular of an alkyne (I) carrying in α- and β-position to the alkyne group two OH groups, to the corresponding furane (II):



I II

where R^1, R^2 and R^3 are independently of each other H, alkyl, cycloalkyl, aryl, heterocyclyl or heteroaryl,

where the alkyl, cycloalkyl, aryl, heterocyclyl or heteroaryl groups R^1, R^2 and R^3 can carry one or more substituents.

28. The method as claimed in claim 26, where the transition metal catalyzed reaction involving C-O bond formation is the formation of alcohols or ethers via C-O coupling,
where an aromatic or heteroaromatic compound R^1-X, where R^1 is an aryl or heteroaryl group and X is a halogen atom or a pseudohalide group, and is in particular Cl, Br, I or SCN, is reacted with a metal hydroxide to yield an alcohol R^1-OH; or is reacted with a hydroxyl compound R^2-OH, where R^2 is alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl or heteroaryl, to yield an ether R^1-O-R^2,
where the alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl or heteroaryl groups R^1 and R^2 can carry one or more substituents.

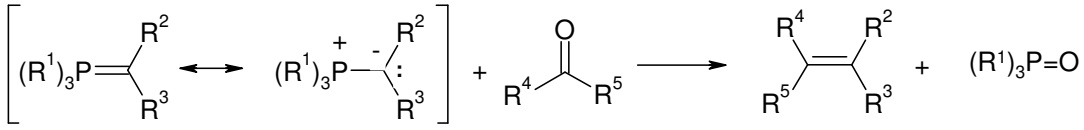
29. The method as claimed in claim 13, where the transition metal catalyzed reaction is a transition metal catalyzed reaction involving C-B bond formation, where the transition metal catalyzed reaction involving C-B bond formation is a Miyaura borylation,
where a halogenide or sulfonate R^2-$(Z)_n$, where R^2 is an alkenyl, aryl or heteroaryl group, Z is a halogenide or sulfonate group (the sulfonate being in particular a fluorinated alkylsulfonate or tosylate, specifically triflate or nonaflate) and n is 1, 2, 3 or 4, is reacted with a tetraalkoxydiboron $(R^1O)_2B$-$B(OR^1)_2$, where R^1 is alkyl or two R^1 bound on oxygen atoms bound in turn to the same B atom form together -$C(CH_3)_3$-$C(CH_3)_2$- (so that $B(OR^1)_2$ is the pinacolon ester of boronic acid), in the presence of a transition metal catalyst, in particular of a Pd catalyst, and optionally also of a base,
where the alkyl, alkenyl, aryl or heteroaryl groups R^1 and R^2 can carry one or more substituents.

30. The method as claimed in claim 13, where the transition metal catalyzed reaction is a transition metal catalyzed reaction involving C-halogen bond formation, in

which an aromatic or heteroaromatic compound R^1-H, where R^1 is aryl or heteroaryl, is reacted with a halogenating agent in the presence of a transition metal catalyst, in particular an Au or a Pd catalyst, to yield a compound R^1-X, where X is a halogen atom, especially Cl, Br or I
where the aryl or heteroaryl group R^1 can carry one or more substituents..

31. The method as claimed in any of claims 1 to 12, where the organic reaction is a C-C coupling reaction not requiring transition metal catalysis, and is selected from the group consisting of reactions of carbonyl or nitrile compounds and pericyclic reactions , and is in particular selected from the group consisting of the Wittig reaction, the Diels-Alder reaction and the Baylis-Hillman reaction.

32. The method as claimed in claim 31, where the C-C coupling reaction not requiring transition metal catalysis is a Wittig reaction in which a phosphorous ylene or ylide (I) is reacted with a carbonyl compound (II) to an olefinically unsaturated compound (III) and a phosphorus oxide (IV)



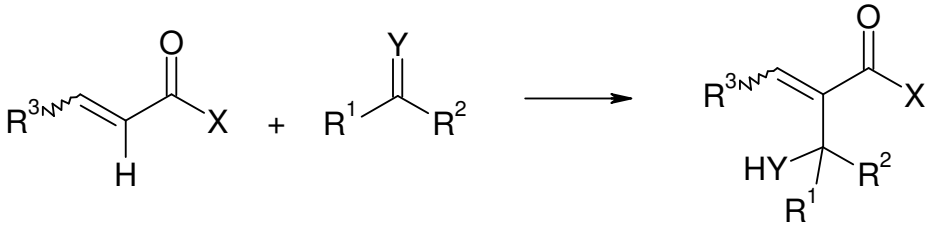
I II III IV

where
R^1 is an aryl group;
R^2 and R^3, independently of each other, are hydrogen, alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl, heteroaryl, CN, $C(O)R^{13}$, $C(S)R^{13}$ or $S(O)_2R^{11}$, where R^{11} and R^{13} are as defined in claim 17; where in particular one of R^2 and R^3 is a CN, $C(O)R^{13}$, $C(S)R^{13}$ or $S(O)_2R^{11}$ group and especially a $C(O)OR^{20}$ group, where R^{11}, R^{13} and R^{20} are as defined in claim 17, and the other radical is hydrogen or C_1-C_4-alkyl; and
R^4 and R^5 are independently of each other hydrogen, alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl,

cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl or heteroaryl;
where the alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl and heteroaryl groups R^1, R^2, R^3, R^4 and R^5 can carry one or more substituents.

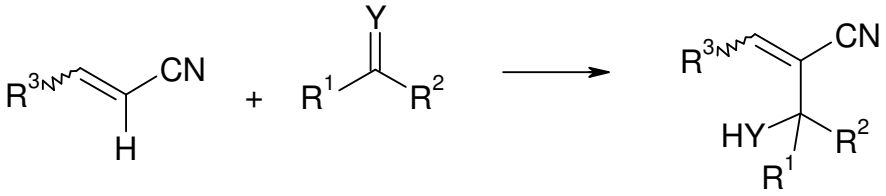
33. The method as claimed in claim 31, where the C-C coupling reaction not requiring transition metal catalysis is a Diels-Alder reaction in which a conjugated diene is reacted with a dienophile to a cyclohexene derivative.

34. The method as claimed in claim 31, where the C-C coupling reaction not requiring transition metal catalysis is a Baylis-Hillman reaction in which an α,β-olefinically unsaturated carbonyl compound (I) is reacted with an aldehyde or an activated ketone or derivative thereof (II) in the presence of a nucleophilic catalyst and optionally in the presence of a metal-derived Lewis acid to a compound (III):



I II III

or in which α,β-olefinically unsaturated nitrile (IV) compound is reacted with a an aldehyde or an activated ketone or derivative thereof (II) in the presence of a nucleophilic catalyst and optionally in the presence of a metal-derived Lewis acid to a compound (V):



IV II V

where R^1, R^2 and R^3 are independently of each other H, alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl,

cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl or heteroaryl, or R^1 and R^2 form together with the carbon atom they are bound to a carbocyclic or heterocyclic ring;
X is OR or $N(R)_2$, where R is H, alkyl, cycloalkyl, heterocyclyl, aryl or heteroaryl,
Y is O or N substituted with an electron-withdrawing group, and
the nucleophilic catalyst is selected from the group consisting of tertiary amines and tertiary phosphines;
where the alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl and heteroaryl groups R^1, R^2, R^3 and R can carry one or more substituents.

35. The method as claimed in any of claims 1 to 12, where the organic reaction is a carboxamide or sulfonamide bond formation reaction, where a carboxylic acid or a carboxylic acid derivative or a sulfonic acid or a sulfonic acid derivative is reacted with a primary or secondary amine, where in case that a carboxylic acid is used, the reaction is optionally carried out in the presence of a coupling reagent.

36. The method as claimed in any of claims 1 to 12, where the organic reaction is a Michael addition, in particular a Michael addition of a primary or secondary amine to an α,β-unsaturated carboxylic acid or acid derivative.

37. The method as claimed in any of claims 1 to 12, where the organic reaction is the introduction of protective groups, in particular the protection of primary or secondary amino groups, specifically the protection of primary or secondary amino groups with (oxy)carbonyl compounds, or the organic reaction is the removal of protective groups, in particular the removal of (oxy)carbonyl groups protecting primary or secondary amino groups.

38. The method as claimed in any of claims 1 to 12, where the organic reaction is a nucleophilic substitution reaction.

39. The method as claimed in claim 38, where a compound R^1-X is reacted with an alcohol R^2-OH, a thiol R^2-SH, a primary amine R^3NH_2 or a secondary amine $R^3(R^4)NH$ to a compound R^1-O-R^2, R^1-S-R^2, R^1-NH-R^3 or R^1-N(R^4)-R^3, or a compound $R^1(X)_2$ is reacted with a primary amine R^3NH_2 to a cyclic compound;
where R^1, R^2, R^3 and R^4, independently of each other, are an alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl or heteroaryl group; and
X is a halogenide or sulfonate group (the sulfonate being in particular a fluorinated alkylsulfonate or tosylate, specifically triflate or nonaflate), especially Cl, Br, I, triflate or nonaflate;
where the alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl or heteroaryl groups R^1, R^2, R^3 and R^4 can carry one or more substituents.

40. The method as claimed in any of claims 38 or 39, where the organic reaction is a nucleophilic aromatic substitution reaction, where a compound R^1-X is reacted with an alcohol R^2-OH, a thiol R^2-SH, a primary amine R^3NH_2 or a secondary amine $R^3(R^4)NH$,
where R^1 is a mono-, bi- or polycyclic aryl or heteroaryl group;
X is a halide, especially F or Cl, and
R^2, R^3 and R^4 are independently of each other an alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl or heteroaryl group,
where the alkyl, alkenyl, alkapolyenyl, alkynyl, alkapolyynyl, mixed alkenyl/alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, mixed cycloalkenyl/cycloalkynyl, polycarbocyclyl, heterocyclyl, aryl, heteroaryl groups R^1, R^2, R^3 and R^4 can carry one or more substituents.

41. The method as claimed in any of claims 1 to 12, where the organic reaction is a reduction or an oxidation reaction.

42. The method as claimed in claim 41, where the organic reaction is the reduction of nitro compounds to the corresponding amino compounds via reduction with a base metal, optionally in acidic solution; with a metal hydride, with a complex hydride, or with a borane; or via catalytic hydrogenation.

43. The method as claimed in claim 42, where an aromatic or heteroaromatic nitro compound R^1-NO_2, where R^1 is a mono-, bi- or polycyclic aryl or heteroaryl group, is reduced with Zn or Fe in acidic solution; or is reduced via catalytic hydrogenation in the presence of a hydrogenation catalyst, where the hydrogenation catalyst comprises at least one metal of group VIII and/or VIIa selected from the group consisting of ruthenium, cobalt, rhodium, nickel, palladium, platinum and rhenium, where the hydrogenation catalyst is a heterogeneous hydrogenation catalyst in which the metal is used in finely divided form, as a metal sponge or as a supported catalyst, or where the catalyst is a homogeneous hydrogenation catalysts; and where the hydrogenation catalyst is specifically Pd on coal;
where the aryl or heteroaryl group R^1 can carry one or more substituents.

44. The method as claimed in claim 41, where the organic reaction is the reduction of C-C double bonds.

45. The method as claimed in claim 41, where the organic reaction is a reductive amination, where a primary or secondary amine is reacted with an aldehyde or ketone in the presence of a reduction agent to an amino compound.

46. The method as claimed in any of claims 1 to 12, where the organic reaction is an ester formation reaction or an ester hydrolysis reaction.

47. The method as claimed in any of the preceding claims, which is additionally carried out in the presence of a surfactant different from the cellulose derivative as defined in claims 1 to 6, where the surfactant is selected from the group consisting of anionic, cationic, nonionic and amphoteric surfactants, block polymers, polyelectrolytes, and mixtures thereof.

48. The method as claimed in claim 47, where the surfactant is a polyoxyethanyl-α-tocopheryl succinate derivative.

49. The method as claimed in any of the preceding claims, where after completion of the organic reaction the cellulose derivative is precipitated by heating or by adding an inorganic salt, preferably by adding an inorganic salt, where the inorganic salt is selected from the group consisting of sodium sulfate, potassium sulfate, magnesium sulfate, ammonium sulfate, sodium phosphate, potassium phosphate, sodium hydrogenphosphate, potassium hydrogenphosphate and sodium chloride, and is in particular sodium sulfate; where precipitation of the cellulose derivative can be carried out before or after removing the reaction product and, if present, unreacted starting compounds, and where the precipitated cellulose derivative, after a reactivation step, can be reused in the method as claimed in any of the preceding claims.

50. The use of a cellulose derivative as defined in any of claims 1 to 6, as a surfactant in organic reactions carried out in a solvent containing at least 90% by weight, in particular at least 97% by weight, based on the total weight of the solvent, of water,
where the organic reactions are not a polymerization or oligomerization reaction of olefinically unsaturated compounds.