Patent Claims

1. Compounds of formula I

$$[Kt]^{z+}\ z[BH(CN)_3]^-$$ I

in which $[Kt]^{z+}$ denotes an inorganic or organic cation and z is 1, 2, 3 or 4,where sodium hydrido-tricyano-borate, potassium hydrido-tricyano-borate, silver hydrido-tricyano-borate and $[(Phenyl)_3P\text{-}N{=}N\text{-}P(Phenyl)_3]$hydrido-tricyano-borate are excluded.

2. Compounds according to claim 1, characterised in that $[Kt]^{z+}$ is an organic cation selected from the group comprising iodonium, tritylium, sulfonium, oxonium, ammonium, phosphonium, uronium, thiouronium, guanidinium cations or heterocyclic cations.

3. Compounds according to claim 1 or 2, in which
Kt^{z+} denotes an inorganic cation selected from the group of H^+, NO^+, Li^+, Mg^{2+}, Cu^+, Cu^{2+}, Zn^{2+},Ca^{2+}, Y^{+3}, Yb^{+3}, La^{+3}, Sc^{+3}, Ce^{+3}, Nd^{+3}, Tb^{+3}, Sm^{+3} or complex (ligands containing) metal cations which include rare-earths, transitions or noble metals like rhodium, ruthenium, iridium, palladium, platinum, osmium, cobalt, nickel, iron, chromium, molybdenum, tungsten, vanadium, titanium, zirconium, hafnium, thorium, uranium, gold,

or an organic cation selected from the group of
tritylium cation, in which the phenyl groups may be substituted by straight-chain or branched alkyl groups having 1 to 20 C atoms, straight-chain or branched alkenyl having 2 to 20 C atoms and one or more double bonds or straight-chain or branched alkynyl having 2 to 20 C atoms and one or more triple bonds,

an oxonium cation of formula (1) or a sulfonium cation of formula (2)

$[(R^o)_3O]^+$ (1)

$[(R^o)_3S]^+$ (2),

where R^o each independently of one another denotes a straight-chain or branched alkyl group having 1-8 C atoms, non-substituted phenyl or phenyl which is substituted by R^{1*}, OR', $N(R')_2$, CN or halogen and in case of sulfonium cations of formula (2) additionally denotes each independently $(R''')_2N$ and R' is independently of each other H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl, R^{1*} is independently of each other non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and R''' is independently of each other straight-chain or branched C_1 to C_6 alkyl;

an ammonium cation, which conforms to the formula (3)

$[NR_4]^+$ (3),

where

R in each case, independently of one another, denotes

H, OR', $N(R')_2$, with the proviso that a maximum of one R in formula (3) is OR' or $N(R')_2$,

straight-chain or branched alkyl having 1-20 C atoms,

straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,

straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds,

saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which may be substituted by straight-chain or branched alkyl groups having 1-6 C atoms,

where one or two R may be fully substituted by halogens, in particular -F and/or -Cl, and one or more of the substituents R may be partially substituted by halogens, in particular -F and/or -Cl, and/or by -OH, -OR', -CN, $-N(R')_2$, -C(O)OH, -C(O)OR', -C(O)R', $-C(O)N(R')_2$,

$-SO_2N(R')_2$, -C(O)X, $-SO_2OH$, $-SO_2X$, $-NO_2$, -SR', -S(O)R', $-SO_2R'$ and where one or two non-adjacent carbon atoms in R which are not in the α-position may be replaced by atoms and/or atom groups selected from the group -O-, -S-, -S(O)-, $-SO_2-$, $-SO_2O-$, -C(O)-, -C(O)O-, $-N^+(R')_2-$, -P(O)R'O-, -C(O)NR'-, $-SO_2NR'-$, -OP(O)R'O-, $-P(O)(N(R')_2)NR'-$, $-P(R')_2=N-$ or -P(O)R'- where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen;

a phosphonium cation, which conforms to the formula (4)

$$[P(R^2)_4]^+ \qquad (4),$$

where

R^2 in each case, independently of one another, denotes

H, OR' or $N(R')_2$,

straight-chain or branched alkyl having 1-20 C atoms,

straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,

straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds,

saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which may be substituted by straight-chain or branched alkyl groups having 1-6 C atoms,

where one or two R^2 may be fully substituted by halogens, in particular -F and/or -Cl, and one or more of the substituents R^2 may be partially substituted by halogens, in particular -F and/or -Cl, and/or by -OH, -OR', -CN, $-N(R')_2$, -C(O)OH, -C(O)OR', -C(O)R', $-C(O)N(R')_2$, $-SO_2N(R')_2$, -C(O)X, $-SO_2OH$, $-SO_2X$, $-NO_2$, -SR', -S(O)R', $-SO_2R'$ and where one or two non-adjacent carbon atoms in R^2 which are not in the α-position may be replaced by atoms and/or atom groups selected from the group -O-, -S-, -S(O)-, $-SO_2-$, $-SO_2O-$, -C(O)-, -C(O)O-, $-N^+(R')_2-$,

-P(O)R'O-, -C(O)NR'-, -SO_2NR'-, -OP(O)R'O-, -P(O)(N(R')$_2$)NR'-, -P(R')$_2$=N- or -P(O)R'- where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen;

a uronium cation, which conforms to the formula (5)

$$[C(NR^3R^4)(OR^5)(NR^6R^7)]^+ \qquad (5),$$

where

R^3 to R^7 each, independently of one another, denote H, where H is excluded for R^5, straight-chain or branched alkyl having 1 to 20 C atoms, straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds, straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds, saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which may be substituted by straight-chain or branched alkyl groups having 1-6 C atoms, where one or two of the substituents R^3 to R^7 may be fully substituted by halogens, in particular -F and/or -Cl, and one or more of the substituents R^3 to R^7 may be partially substituted by halogens, in particular -F and/or -Cl, and/or by -OH, -OR', -N(R')$_2$, -CN, -C(O)OH, -C(O)OR', -C(O)R', -C(O)N(R')$_2$, -SO_2N(R')$_2$, -C(O)X, -SO_2OH, -SO_2X, -SR', -S(O)R', -SO_2R', -NO_2 and where one or two non-adjacent carbon atoms in R^3 to R^7 which are not in the α-position may be replaced by atoms and/or atom groups selected from the group -O-, -S-, -S(O)-, -SO_2-, -SO_2O-, -C(O)-, -C(O)O-, -N^+(R')$_2$-, -P(O)R'O-, -C(O)NR'-, -SO_2NR'-, -OP(O)R'O-, -P(O)(N(R')$_2$)NR'-, -P(R')$_2$=N- or -P(O)R'- where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen;

a thiouronium cation, which conforms to the formula (6)

$$[C(NR^3R^4)(SR^5)(NR^6R^7)]^+ \qquad (6),$$

where

R^3 to R^7 each, independently of one another, denote
H, where H is excluded for R^5,
straight-chain or branched alkyl having 1 to 20 C atoms,
straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,
straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds,
saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which may be substituted by straight-chain or branched alkyl groups having 1-6 C atoms, where one or two of the substituents R^3 to R^7 may be fully substituted by halogens, in particular -F and/or -Cl, and one or more of the substituents R^3 to R^7 may be partially substituted by halogens, in particular -F and/or -Cl, and/or by -OH, -OR', $-N(R')_2$, -CN, -C(O)OH, -C(O)OR', -C(O)R', $-C(O)N(R')_2$, $-SO_2N(R')_2$, -C(O)X, $-SO_2OH$, $-SO_2X$, -SR', -S(O)R', $-SO_2R'$, $-NO_2$ and where one or two non-adjacent carbon atoms in R^3 to R^7 which are not in the α-position may be replaced by atoms and/or atom groups selected from the group -O-, -S-, -S(O)-, $-SO_2-$, $-SO_2O-$, -C(O)-, -C(O)O-, $-N^+(R')_2-$, -P(O)R'O-, -C(O)NR'-, $-SO_2NR'-$, -OP(O)R'O-, $-P(O)(N(R')_2)NR'-$, $-P(R')_2=N-$ or -P(O)R'- where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen;

a guanidinium cation, which conforms to the formula (7)

$$[C(NR^8R^9)(NR^{10}R^{11})(NR^{12}R^{13})]^+ \qquad (7),$$

where

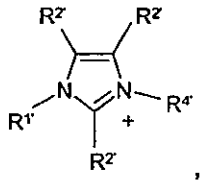
R^8 to R^{13} each, independently of one another, denote

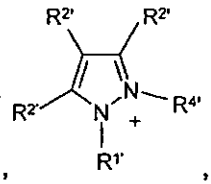
H, -CN, $N(R')_2$, -OR',
straight-chain or branched alkyl having 1 to 20 C atoms,
straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,
straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds,
saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which may be substituted by straight-chain or branched alkyl groups having 1-6 C atoms,
where one or two of the substituents R^8 to R^{13} may be fully substituted by halogens, in particular -F and/or -Cl, and one or more of the substituents R^8 to R^{13} may be partially substituted by halogens, in particular -F and/or -Cl, and/or by -OH, -OR', $-N(R')_2$, -CN, -C(O)OH, -C(O)OR', -C(O)R', $-C(O)N(R')_2$, $-SO_2N(R')_2$, -C(O)X, $-SO_2OH$, $-SO_2X$, -SR', -S(O)R', $-SO_2R'$, $-NO_2$ and where one or two non-adjacent carbon atoms in R^8 to R^{13} which are not in the α-position may be replaced by atoms and/or atom groups selected from the group -O-, -S-, -S(O)-, $-SO_2-$, $-SO_2O-$, -C(O)-, -C(O)O-, $-N^+(R')_2-$, -P(O)R'O-, -C(O)NR'-, $-SO_2NR'-$, $-OP(O)R'O-$, $-P(O)(N(R')_2)NR'-$, $-P(R')_2=N-$ or -P(O)R'-,
where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen;

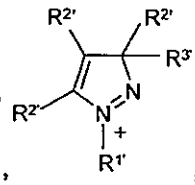
a heterocyclic cation which conforms to the formula (8)

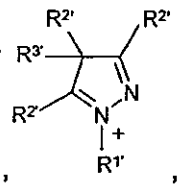
$$[HetN]^{z+} \qquad (8)$$

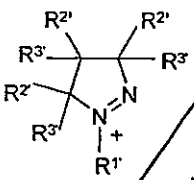
where
$HetN^{z+}$ denotes a heterocyclic cation selected from the group

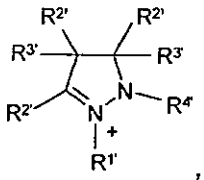
imidazolium 

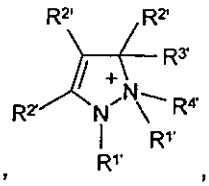
1H-pyrazolium 

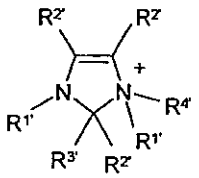
3H-pyrazolium 

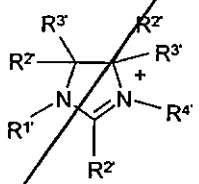
4H-pyrazolium 

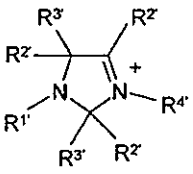
1-pyrazolinium 

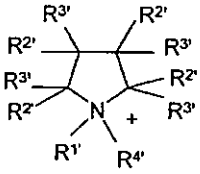
2-pyrazolinium 

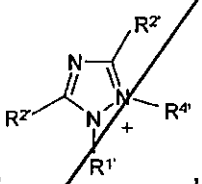
3-pyrazolinium 

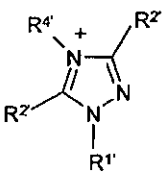
2,3-dihydroimidazolinium 

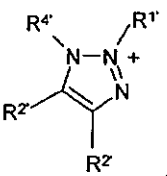
4,5-dihydroimidazolinium 

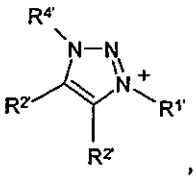
2,5-dihydroimidazolinium 

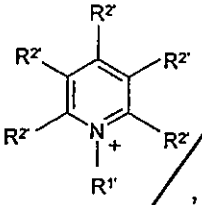
pyrrolidinium 

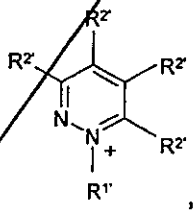
1,2,4-triazolium 

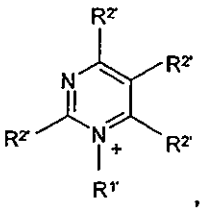
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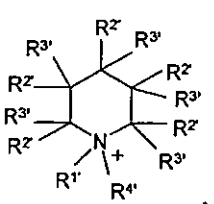
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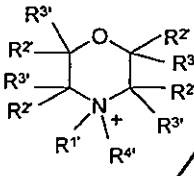
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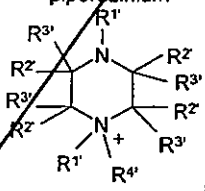
pyridinium 

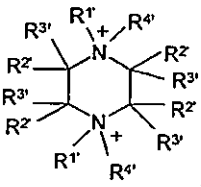
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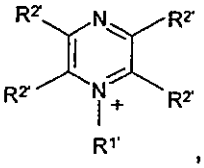
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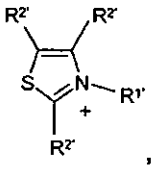
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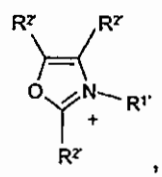
morpholinium 

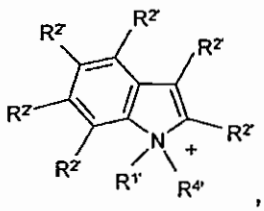
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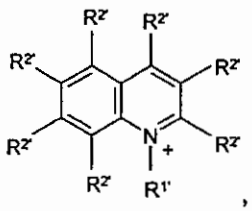
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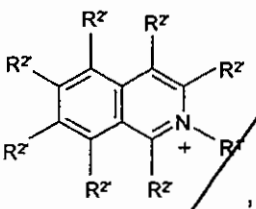
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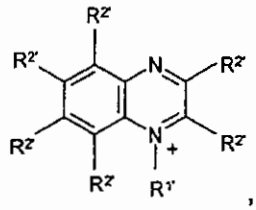
thiazolium 

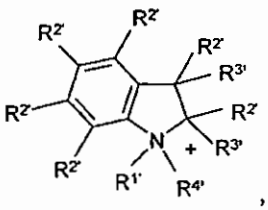
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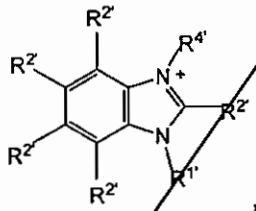
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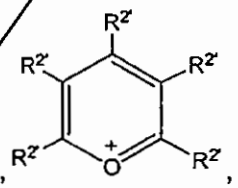
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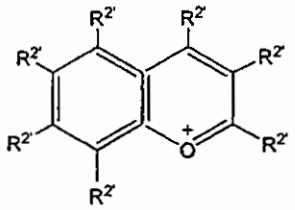
isoquinolinium  ,

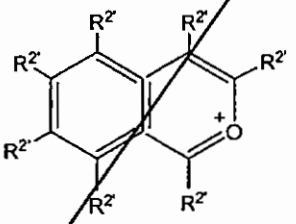
quinoxalinium  ,

indolinium  ,

benzimidazolium  ,

Pyrylium  ,

Chromylium (1-Benzopyrylium) 

or Isochromylium (2-Benzopyrylium)  ,

where the substituents

$R^{1'}$ to $R^{4'}$ each, independently of one another, denote

H,

straight-chain or branched alkyl having 1-20 C atoms,

straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,

straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds,

saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which may be substituted by straight-chain or branched alkyl groups having 1-6 C atoms,

saturated, partially or fully unsaturated heteroaryl, heteroaryl-C_1-C_6-alkyl or aryl-C_1-C_6-alkyl and

$R^{2'}$ denote additionally F, Cl, Br, I, -CN, -OR', -N(R')$_2$, -P(O)(R')$_2$, -P(O)(OR')$_2$, -P(O)(N(R')$_2$)$_2$, -C(O)R', -C(O)OR', -C(O)X, -C(O)N(R')$_2$, -SO_2N(R')$_2$, -SO_2OH, -SO_2X, -SR', -S(O)R', -SO_2R' and/or NO_2, with the

proviso that $R^{1'}$, $R^{3'}$, $R^{4'}$ are in this case independently of each other H and/or a straight-chain or branched alkyl having 1-20 C atoms, straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,

where the substituents $R^{1'}$, $R^{2'}$, $R^{3'}$ and/or $R^{4'}$ together may also form a ring system,
where one to three substituents $R^{1'}$ to $R^{4'}$ may be fully substituted by halogens, in particular -F and/or -Cl, and one or more substituents $R^{1'}$ to $R^{4'}$ may be partially substituted by halogens, in particular -F and/or -Cl, and/or by -OH, -OR', $N(R')_2$, -CN, -C(O)OH, -C(O)OR', -C(O)R', -$C(O)N(R')_2$, -$SO_2N(R')_2$, -C(O)X, -SO_2OH, -SO_2X, -SR', -S(O)R', -SO_2R', -NO_2, but where $R^{1'}$ and $R^{4'}$ cannot simultaneously be fully substituted by halogens and where, in the substituents $R^{1'}$ to $R^{4'}$, one or two non-adjacent carbon atoms which are not bonded to the heteroatom may be replaced by atoms and/or atom groups selected from the -O-, -S-, -S(O)-, -SO_2-, -SO_2O-, -C(O)-, -C(O)O-, -$N^+(R')_2$-, -P(O)R'O-, -C(O)NR'-, -SO_2NR'-, -OP(O)R'O-, -P(O)($N(R')_2$)NR'-, -$P(R')_2$=N- or -P(O)R'-,
where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen or

a iodonium cation which conforms to the formula (9)

$$Ar—\overset{+}{I}—Ar \qquad (9)$$

,

where
the aryl group Ar denotes each independently of each other aryl with 6 to 30 C atoms which is non-substituted or substituted with at least a straight-chain or branched alkyl group having 1 to 20 C atoms, a straight-chain or branched alkenyl group having 2 to 20 C atoms and

one or more double bonds, a straight-chain or branched alkynyl group having 2 to 20 C atoms and one or more triple bonds, R^{1*}, NO_2, SR', $N(R')_2$, CN and/or halogen and

where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and

where R^{1*} each independently is non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl

and halogen is F, Cl, Br or I.

4. Process for the preparation of a compound of formula I according to claim 1 in which $[Kt]^{z+}$ is an alkali metal cation and z denotes 1 which denotes a compound of formula I-1 including sodium hydrido-tricyano-borate and potassium hydrido-tricyano-borate,

$$[Me]^+ [BH(CN)_3]^- \qquad \text{I-1}$$

comprising in step 1 the reaction of a compound of formula II

$$[Me^1]^+ [B(CN)_4]^- \qquad \text{II}$$

with an alkali metal [Me],

where $[Me^1]^+$ in formula II denotes an alkali metal cation which is different or equal to the alkali metal [Me] resulting in the formation of a compound of formula III

$$\{[Me]^+\}_2 [B(CN)_3]^{2-} \qquad \text{III}$$

in which $[Me]^+$ denotes the alkali metal cation of the alkali metal and comprising in step 2 the hydrolysis of the compound of formula III resulted from step 1.

5. Process for the preparation of a compound of formula I according to claim 1 in which $[Kt]^{z+}$ is the cation of potassium and z denotes 1 which denotes a compound of formula I-2

$$[K]^+ [BH(CN)_3]^- \qquad \text{I-2}$$

comprising the reaction of a compound of formula IV

$$[Me^2]^+ [BH_4]^- \qquad IV$$

in which $[Me^2]^+$ denotes an alkali metal cation

with {4 KSCN + $K_2[Zn(SCN)_4]$} and purification from minor amounts of the optional side product $K[BH_2(CN)_2]$.

6. Process for the preparation of a compound of formula I according to claim 1 in which $[Kt]^{z+}$ is an alkali metal cation and z denotes 1 comprising the reaction of a compound of formula II

$$[Me^1]^+ [B(CN)_4]^- \qquad II$$

with a strong base, preferably an alkali metal hydroxide, an alkali metal amide, a substituted amide or alkali metal alcoholate, where $[Me^1]^+$ in formula II denotes an alkali metal cation which is different or equal to the alkali metal cation of the alkali metal hydroxide, alkali metal amide or alkali metal alcoholate.

7. Process for the preparation of a compound of formula I according to one or more of claims 1 to 3 in which $[Kt]^{z+}$ is another cation than the used alkali metal cation in the starting material and z denotes 1, 2, 3 or 4 including sodium hydrido-tricyano-borate, potassium hydrido-tricyano-borate and silver hydrido-tricyano-borate in a salt-exchange reaction, characterized in that an alkali metal salt of formula I-1

$$[Me]^+ [BH(CN)_3]^- \qquad I\text{-}1$$

in which $[Me]^+$ is an alkali metal cation or $H[BH(CN)_3]$ is reacted with a compound of formula V

$$KtA \qquad V,$$

in which

Kt has a meaning of an organic cation or inorganic cation other than the alkali metal cation of the compound of formula I-1 or H^+ and

A denotes F^-, Cl^-, Br^-, I^-, OH^-, $[HF_2]^-$, $[CN]^-$, $[SCN]^-$, $[R_1COO]^-$, $[R_1OC(O)O]^-$, $[R_1SO_3]^-$, $[R_2COO]^-$, $[R_2SO_3]^-$, $[R_1OSO_3]^-$, $[PF_6]^-$, $[BF_4]^-$, $[SO_4]^{2-}$, $[HSO_4]^{1-}$, $[NO_3]^-$, $[(R_2)_2P(O)O]^-$, $[R_2P(O)O_2]^{2-}$, $[(R_1O)_2P(O)O]^-$,

$[(R_1O)P(O)O_2]^{2-}$, $[(R_1O)R_1P(O)O]^-$, tosylate, malonate which may be substituted by straight-chain or branched alkyl groups having 1 to 4 C atoms, $[HOCO_2]^-$ or $[CO_3]^{2-}$, with the proviso that $[SO_4]^{2-}$ and $[CO_3]^{2-}$ are used merely for the synthesis of compounds of formula I having another metal cation than the alkali metal cation of the compound of formula I-1,
in which R_1 is each independently of another a straight-chain or branched alkyl group having 1 to 12 C atoms and
R_2 is each independently of one another a straight-chain or branched perfluorinated alkyl group having 1 to 12 C atoms and where electroneutrality should be taken into consideration in the formula of the salt KtA.

8. An electrolyte formulation comprising at least one compound of formula I according to one or more of claims 1 to 3.

9. An electrochemical and/or optoelectronic device comprising an electrolyte formulation according to claim 7.

10. Use of compounds of formula I according to one or more of claims 1 to 3 in which $[Kt]^{z+}$ is an organic cation or H^+ and z is 1, 2, 3 or 4 as media for chemical reactions, as catalyst and/or as media in catalytical processes, as conducting salts, as components of electrolytes for the application in electrochemical cells, as components of supporting electrolytes for electrochemical processes, as surfactants, as phase-transfer catalysts, as trainer, as extractant; as antistatic additive, as plasticiser; as heat-transfer-medium, as modifier for membranes and textile materials; as lubricant, as additive to lubricant compositions or to another engineering fluids; as hydraulic fluid or as additive to hydraulic fluids.

11. Use of compounds of formula I according to one or more of claims 1 to 3 in which $[Kt]^{z+}$ is a cation of formula (2), (5), (6), (9), tritylium, pyrylium, 1-benzopyrylium or 2-benzopyrylium as cationic polymerization initiator, photo-polymerization initiator or photo-acid generator.

12. Use of compounds of formula I-1

$$[Me]^+ [BH(CN)_3]^- \qquad \text{I-1}$$

in which $[Me]^+$ is an alkali metal cation including sodium hydrido-tricyano-borate and potassium hydrido-tricyano-borate for the synthesis of compounds of formula I according to one or more of claims 1 to 3 in which $[Kt]^{z+}$ is an organic cation and z is 1, 2, 3 or 4.

13. Compounds of formula III

$$\{[Me]^+\}_2 [B(CN)_3]^{2-} \qquad \text{III}$$

in which $[Me]^+$ denotes an alkali metal cation.

14. Process for the preparation of a compound of formula III according to claim 12 comprising the reaction of a compound of formula II

$$[Me^1]^+ [B(CN)_4]^- \qquad \text{II}$$

in which $[Me^1]^+$ denotes an alkali metal cation with an alkali metal $[Me^1]$ in which the alkali metal $[Me^1]$ and the alkali metal cation $[Me^1]^+$ are the same or different.

15. Use of compounds according to claim 12 for the introduction of $B(CN)_3$-groups in chemical substances.

Claims

1. A compound of formula I

$$[Kt]^{z+}z[BH(CN)_3]^- \quad I$$

in which $[Kt]^{z+}$ denotes an inorganic or organic cation and z is 1,2, 3 or 4, where sodium hydrido-tricyano-borate, potassium hydrido-tricyano-borate, silver hydrido-tricyano-borate and $PPN[HB(CN)_3]$ are excluded.

2. A compound according to claim 1, wherein $[Kt]^{z+}$ is an organic cation selected from the group consisting of iodonium, tritylium, sulfonium, oxonium, ammonium, phosphonium, uronium, thiouronium, guanidinium cations and heterocyclic cations.

3. A compound according to claim 1, in which Kt^{z+} denotes

an inorganic cation selected from the group consisting of H^+, NO^+, Li^+, Mg^{2+}, Cu^+, Cu^{2+}, Zn^{2+}, Ca^{2+}, Y^{+3}, Yb^{+3}, La^{+3}, Sc^{+3}, Ce^{+3}, Nd^{+3}, Tb^{+3}, Sm^{+3} and complex (ligands containing) metal cations,

an organic cation, which is a tritylium cation, in which the phenyl groups are optionally substituted by straight-chain or branched alkyl groups having 1 to 20 C atoms, straight-chain or branched alkenyl having 2 to 20 C atoms and one or more double bonds or straight-chain or branched alkynyl having 2 to 20 C atoms and one or more triple bonds,

an oxonium cation of formula (1) or a sulfonium cation of formula (2)

$$[(R^O)_3O]^+ \qquad (1)$$

$$[(R^O)_3S]^+ \qquad (2),$$

where

R^O each independently of one another denotes a straight-chain or branched alkyl group having

1-8 C atoms, non-substituted phenyl or phenyl which is substituted by R^{1*}, OR', $N(R')_2$, CN or halogen and in case of sulfonium cations of formula (2) additionally denotes each independently $(R''')_2N$,

R' is independently of each other H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl,

R^{1*} is independently of each other non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and

R''' is independently of each other straight-chain or branched C_1 to C_6 alkyl;

an ammonium cation of formula (3)

$$[NR_4]^+ \qquad (3),$$

where

R in each case, independently of one another, denotes

H, OR', or $N(R')_2$, with the proviso that a maximum of one R in formula (3) is OR' or $N(R')_2$,

straight-chain or branched alkyl having 1-20 C atoms,

straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,

straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds,

saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which is optionally substituted by straight-chain or branched alkyl groups having 1-6 C atoms,

where one or two R may be fully substituted by halogens, and one or more of R are optionally partially substituted by halogens, and/or by -OH, -OR', -CN, $-N(R')_2$, -C(O)OH, -C(O)OR', -C(O)R', $-C(O)N(R')_2$, $-SO_2N(R')_2$, -C(O)X, $-SO_2OH$, $-SO_2X$, $-NO_2$, -SR', -S(O)R', and/or $-SO_2R'$ and where one or two non-adjacent carbon atoms in R which are not in the α-position are optionally replaced by atoms and/or atom groups selected from the group consisting of -O-, -S-, -S(O)-, $-SO_2-$, $-SO_2O-$, -C(O)-, -C(O)O-, $-N^+(R')_2-$, -P(O)R'O-, -C(O)NR'-, $-SO_2NR'-$, -OP(O)R'O-, $-P(O)(N(R')_2)NR'-$, $-P(R')_2=N-$ and -P(O)R'- where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen;

a phosphonium cation of formula (4)

$$[P(R^2)_4]^+ \qquad (4),$$

where

R^2 in each case, independently of one another, denotes

H, OR' or $N(R')_2$,

straight-chain or branched alkyl having 1-20 C atoms,

straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,

straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds,

saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which is optionally substituted by straight-chain or branched alkyl groups having 1-6 C atoms,

where one or two R^2 are optionally fully substituted by halogens, and one or more of R^2 are optionally partially substituted by halogens, and/or by -OH, -OR', -CN, $-N(R')_2$, -C(O)OH, -C(O)OR', -C(O)R', $-C(O)N(R')_2$, $-SO_2N(R')_2$, -C(O)X, $-SO_2OH$, $-SO_2X$, $-NO_2$, -SR', -S(O)R', and/or $-SO_2R'$ and where one or two non-adjacent carbon atoms in R^2 which are not in the α-position are optionally replaced by atoms and/or atom groups selected from the group consisting of -O-, -S-, -S(O)-, $-SO_2-$, $-SO_2O-$, -C(O)-, -C(O)O-, $-N^+(R')_2-$, -P(O)R'O-, $-C(O)NR'-$, $-SO_2NR'-$, $-OP(O)R'O-$, $-P(O)(N(R')_2)NR'-$, $-P(R')_2=N-$ and -P(O)R'- where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen;

a uronium cation of formula (5)

$$[C(NR^3R^4)(OR^5)(NR^6R^7)]^+ \qquad (5),$$

where

R^3 to R^7 each, independently of one another, denote

H, where H is excluded for R^5,

straight-chain or branched alkyl having 1 to 20 C atoms,

straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,

straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds,

saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which is optionally substituted by straight-chain or branched alkyl groups having 1-6 C atoms, where one or two of the substituents R^3 to R^7 are optionally fully substituted by halogens, and one or more of R^3 to R^7 are optionally partially substituted by halogens, and/or by -OH, -OR', $-N(R')_2$, -CN, -

C(O)OH, -C(O)OR', -C(O)R', -C(O)N(R')$_2$, -SO$_2$N(R')$_2$, -C(O)X, -SO$_2$OH, -SO$_2$X, -SR', -S(O)R', -SO$_2$R', and/or -NO$_2$ and where one or two non-adjacent carbon atoms in R^3 to R^7 which are not in the α-position are optionally replaced by atoms and/or atom groups selected from the group consisting of -O-, -S-, -S(O)-, -SO$_2$-, -SO$_2$O-, -C(O)-, -C(O)O-, -N$^+$(R')$_2$-, -P(O)R'O-, -C(O)NR'-, -SO$_2$NR'-, -OP(O)R'O-, -P(O)(N(R')$_2$)NR'-, -P(R')$_2$=N- and -P(O)R'- where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C$_1$- to C$_{18}$-alkyl, saturated C$_3$- to C$_7$-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen;

a thiouronium cation of formula (6)

$$[C(NR^3R^4)(SR^5)(NR^6R^7)]^+ \qquad (6),$$

where

R^3 to R^7 each, independently of one another, denote

H, where H is excluded for R^5,

straight-chain or branched alkyl having 1 to 20 C atoms,

straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,

straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds,

saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which is optionally substituted by straight-chain or branched alkyl groups having 1-6 C atoms, where one or two of R^3 to R^7 are optionally fully substituted by halogens, and one or more of the substituents R^3 to R^7 are optionally partially substituted by halogens, and/or by -OH, -OR', -N(R')$_2$, -CN, -C(O)OH, -C(O)OR', -C(O)R', -C(O)N(R')$_2$, -SO$_2$N(R')$_2$, -C(O)X, -SO$_2$OH, -SO$_2$X, -SR', -S(O)R', -SO$_2$R', and/or -NO$_2$ and where one or two non-adjacent carbon atoms in R^3 to R^7 which are not in the α-position are optionally replaced by atoms and/or atom groups selected from the group consisting of -O-, -S-, -S(O)-, -SO$_2$-, -SO$_2$O-, -C(O)-, -C(O)O-, -N$^+$(R')$_2$-, -P(O)R'O-, -C(O)NR'-, -SO$_2$NR'-, -OP(O)R'O-, -P(O)(N(R')$_2$)NR'-, -P(R')$_2$=N- and -P(O)R'- where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C$_1$- to C$_{18}$-alkyl, saturated C$_3$- to C$_7$-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen;

a guanidinium cation of formula (7)

$$[C(NR^8R^9)(NR^{10}R^{11})(NR^{12}R^{13})]^+ \qquad (7),$$

where

R^8 to R^{13} each, independently of one another, denote

H, -CN, $N(R')_2$, or -OR',

straight-chain or branched alkyl having 1 to 20 C atoms,

straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,

straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds,

saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which is optionally substituted by straight-chain or branched alkyl groups having 1-6 C atoms,

where one or two of the substituents R^8 to R^{13} are optionally fully substituted by halogens, and one or more of the substituents R^8 to R^{13} are optionally partially substituted by halogens, and/or by -OH, -OR', $-N(R')_2$, -CN, -C(O)OH, -C(O)OR', -C(O)R', $-C(O)N(R')_2$, $-SO_2N(R')_2$, -C(O)X, $-SO_2OH$, $-SO_2X$, -SR', -S(O)R', $-SO_2R'$, and/or $-NO_2$ and where one or two non-adjacent carbon atoms in R^8 to R^{13} which are not in the α-position are optionally replaced by atoms and/or atom groups selected from the group consisting of -O-, -S-, -S(O)-, $-SO_2-$, $-SO_2O-$, -C(O)-, -C(O)O-, $-N^+(R')_2-$, -P(O)R'O-, -C(O)NR'-, $-SO_2NR'-$, -OP(O)R'O-, $-P(O)(N(R')_2)NR'-$, $-P(R')_2=N-$ and -P(O)R'-, where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen;

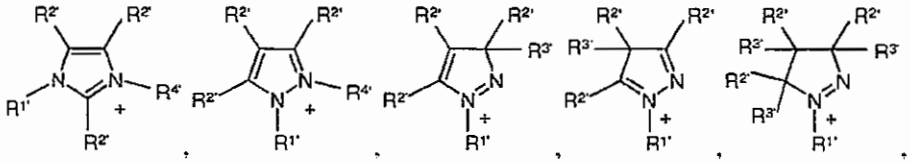
a heterocyclic cation of formula (8)

$$[HetN]^{z+} \qquad (8)$$

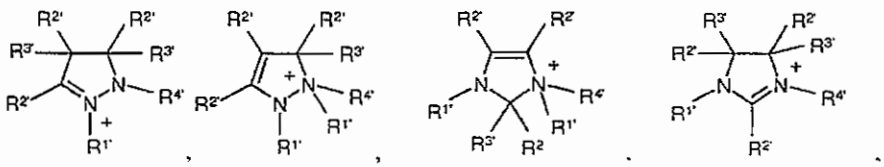
which

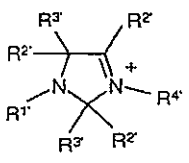
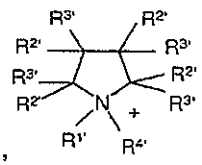
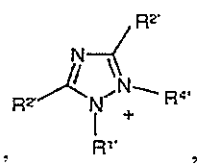
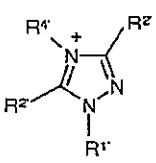
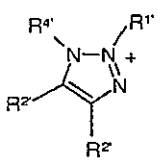
$[HetN]^{z+}$ denotes a heterocyclic cation selected from the group consisting of

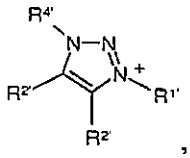
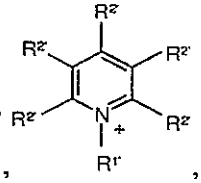
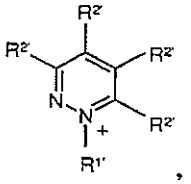
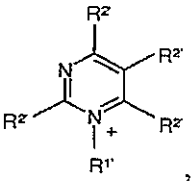
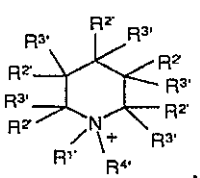
imidazolium 1H-pyrazolium 3H-pyrazolium 4H-pyrazolium 1-pyrazolinium

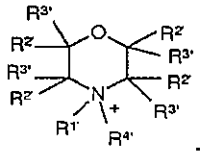
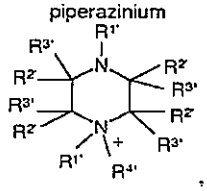
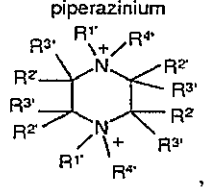
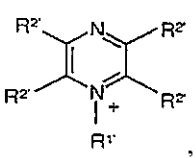
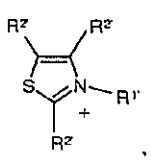


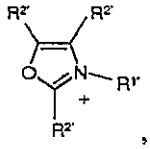
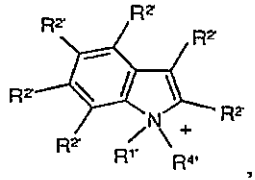
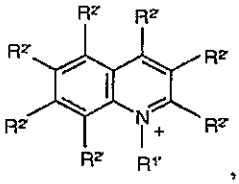
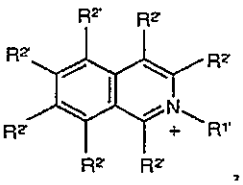
2-pyrazolinium 3-pyrazolinium 2,3-dihydroimidazolinium 4,5-dihydroimidazolinium

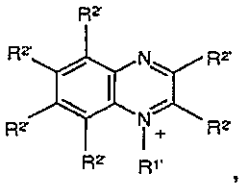
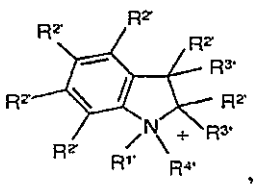
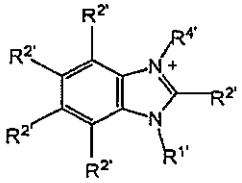
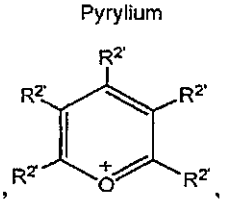


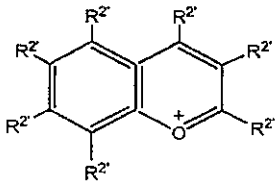
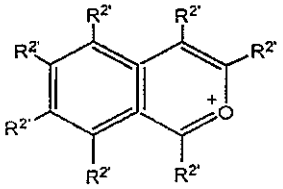
2,5-dihydroimidazolinium , pyrrolidinium , 1,2,4-triazolium , 1,2,4-triazolium , 1,2,3-triazolium ,

1,2,3-triazolium , pyridinium , pyridazinium , pyrimidinium , piperidinium ,

morpholinium , piperazinium , piperazinium , pyrazinium , thiazolium ,

oxazolium , indolium , quinolinium , isoquinolinium ,

quinoxalinium , indolinium , benzimidazolium , Pyrylium ,

Chromylium (1-Benzopyrylium)  Isochromylium (2-Benzopyrylium) 

and

where

$R^{1'}$ to $R^{4'}$ each, independently of one another, denote

H,

straight-chain or branched alkyl having 1-20 C atoms,
straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,
straight-chain or branched alkynyl having 2-20 C atoms and one or more triple bonds,
saturated, partially or fully unsaturated cycloalkyl having 3-7 C atoms, which is optionally substituted by straight-chain or branched alkyl groups having 1-6 C atoms,
saturated, partially or fully unsaturated heteroaryl, heteroaryl-C_1-C_6-alkyl or aryl-C_1-C_6-alkyl
and
$R^{2'}$ denote additionally F, Cl, Br, I, -CN, -OR', -$N(R')_2$, -$P(O)(R')_2$, -$P(O)(OR')_2$, -$P(O)(N(R')_2)_2$, -C(O)R', -C(O)OR', -C(O)X, -$C(O)N(R')_2$, -$SO_2N(R')_2$, -SO_2OH, -SO_2X, -SR', -S(O)R', -SO_2R' and/or NO_2, with the proviso that $R^{1'}$, $R^{3'}$, $R^{4'}$ are in this case independently of each other H and/or a straight-chain or branched alkyl having 1-20 C atoms, and/or a straight-chain or branched alkenyl having 2-20 C atoms and one or more double bonds,
where the substituents $R^{1'}$, $R^{2'}$, $R^{3'}$ and/or $R^{4'}$ together optionally form a ring system,
where one to three substituents $R^{1'}$ to $R^{4'}$ are optionally fully substituted by halogens, and one or more of $R^{1'}$ to $R^{4'}$ are optionally partially substituted by halogens, and/or by -OH, -OR', $N(R')_2$, -CN, -C(O)OH, -C(O)OR', -C(O)R', -$C(O)N(R')_2$, -$SO_2N(R')_2$, -C(O)X, -SO_2OH, -SO_2X, -SR', -S(O)R', -SO_2R', and/or -NO_2, but where $R^{1'}$ and $R^{4'}$ cannot simultaneously be fully substituted by halogens and where, in the substituents $R^{1'}$ to $R^{4'}$, one or two non-adjacent carbon atoms which are not bonded to the heteroatom are optionally replaced by atoms and/or atom groups selected from the group consisting of -O-, -S-, -S(O)-, -SO_2-, -SO_2O-, -C(O)-, -C(O)O-, -$N^+(R')_2$-, -P(O)R'O-, -C(O)NR'-, -SO_2NR'-, -OP(O)R'O-, -$P(O)(N(R')_2)NR'$-, -$P(R')_2$=N- and -P(O)R'-,
where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl and X each independently is halogen

or

a iodonium cation of formula (9)

$$Ar—\overset{+}{I}—Ar \qquad (9)$$

where

the aryl group Ar denotes each independently of each other aryl with 6 to 30 C atoms which is non-substituted or substituted with at least a straight-chain or branched alkyl group having 1 to 20 C atoms, a straight-chain or branched alkenyl group having 2 to 20 C atoms and one or more double bonds, a straight-chain or branched alkynyl group having 2 to 20 C atoms and one or more triple bonds, R^1 *, NO_2, SR', $N(R')_2$, CN and/or halogen,

where R' each independently is H, non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl,

where R^1* each independently is non-fluorinated, partially fluorinated or perfluorinated straight-chain or branched C_1- to C_{18}-alkyl, saturated C_3- to C_7-cycloalkyl, non-substituted or substituted phenyl, and halogen is F, Cl, Br or I.

4. A process for preparing a compound of formula I according to claim 1 in which $[Kt]^{z+}$ is another cation than the alkali metal cation in the starting material and z denotes 1, 2, 3 or 4 in a salt-exchange reaction,

comprising

reacting an alkali metal salt of formula I-1

$$[Me]^+ [BH(CN)_3]^- \qquad \text{I-1}$$

in which $[Me]^+$ is an alkali metal cation

or

reacting $H[BH(CN)_3]$

with a compound of formula V

$$KtA \qquad \text{V},$$

in which

Kt has a meaning of an organic cation or inorganic cation other than the alkali metal cation of the compound of formula I-1 or H^+ and

A denotes F^-, Cl^-, Br^-, I^-, OH^-, $[HF_2]^-$, $[CN]^-$, $[SCN]^-$, $[R_1COO]^-$, $[R_1OC(O)O]^-$, $[R_1SO_3]^-$, $[R_2COO]^-$, $[R_2SO_3]^-$, $[R_1OSO_3]^-$, $[PF_6]^-$, $[BF_4]^-$, $[SO_4]^{2-}$, $[HSO_4]^{1-}$, $[NO_3]^-$,

$[(R_2)_2P(O)O]^-$, $[R_2P(O)O_2]^{2-}$, $[(R_1O)_2P(O)O]^-$, $[(R_1O)P(O)O_2]^{2-}$, $[(R_1O)R_1P(O)O]^-$, tosylate, malonate which is optionally substituted by straight-chain or branched alkyl groups having 1 to 4 C atoms, $[HOCO_2]^-$ or $[CO_3]^{2-}$, with the proviso that $[SO_4]^{2-}$ and $[CO_3]^{2-}$ are only for the synthesis of compounds of formula I having another metal cation than the alkali metal cation of the compound of formula I-1,

R_1 is each independently of another a straight-chain or branched alkyl group having 1 to 12 C atoms, and

R_2 is each independently of one another a straight-chain or branched perfluorinated alkyl group having 1 to 12 C atoms.

5. An electrolyte formulation comprising at least one compound of formula I according to claim 1.

6. An electrochemical and/or optoelectronic device comprising an electrolyte formulation according to claim 5.

7. A method for cationic polymerization or photo polymerization or for photo acid generation, comprising initiating said cationic polymerization or photo polymerization, or generating said photo acid by a compound of formula I according to claim 3 in which $[Kt]^{z+}$ is a cation of formula (2), (5), (6), (9), tritylium, pyrylium, 1-benzopyrylium or 2-benzopyrylium, which acts as a cationic polymerization initiator, photo-polymerization initiator or photo-acid generator.

8. A media for a chemical reaction, a catalyst and/or a media in a catalytical process, a conducting salt, a component of electrolytes for the application in electrochemical cells, a component of supporting electrolytes for an electrochemical process, a surfactant, a phase-transfer catalyst, a trainer, an extractant; an antistatic additive, a plasticiser; a heat-transfer-medium, a modifier for a membrane or textile material; a lubricant, an additive to a lubricant composition or to an engineering fluid; a hydraulic fluid or an additive to a hydraulic fluid, comprising a compound of formula I according to claim 1 in which $[Kt]^{z+}$ is an organic cation or H^+ and z is 1, 2, 3 or 4.

9. A compound according to claim 1, in which Kt^{z+} denotes an inorganic cation selected from the group consisting of H^+, NO^+, Li^+, Mg^{2+}, Cu^+, Cu^{2+}, Zn^{2+},Ca^{2+}, Y^{+3}, Yb^{+3}, La^{+3}, Sc^{+3}, Ce^{+3}, Nd^{+3}, Tb^{+3}, Sm^{+3} and complex (ligands containing) metal cations, wherein the metal is selected from the group consisting of rare-earths, transitions metals and noble metals.

10. A compound according to claim 1, in which Kt^{z+} denotes an inorganic cation selected from the group consisting of H^+, NO^+, Li^+, Mg^{2+}, Cu^+, Cu^{2+}, Zn^{2+},Ca^{2+}, Y^{+3}, Yb^{+3}, La^{+3}, Sc^{+3}, Ce^{+3}, Nd^{+3}, Tb^{+3}, Sm^{+3} and complex (ligands containing) metal cations, wherein the metal is selected from the group consisting of rhodium, ruthenium, iridium, palladium, platinum, osmium, cobalt, nickel, iron, chromium, molybdenum, tungsten, vanadium, titanium, zirconium, hafnium, thorium, uranium and gold.

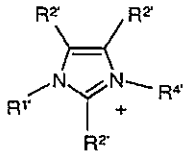
11. A compound according to claim 3, in which Kt^{z+} denotes
a heterocyclic cation of formula (8)

$$[HetN]^{z+} \qquad (8)$$

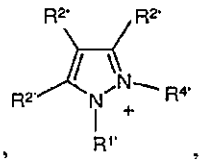
which

$[HetN]^{z+}$ denotes a heterocyclic cation selected from the group consisting of

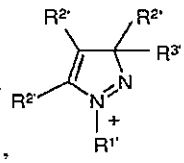
imidazolium



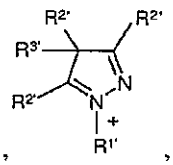
1H-pyrazolium



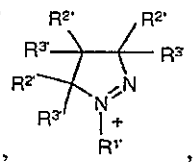
3H-pyrazolium



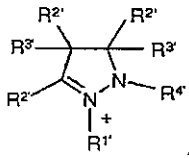
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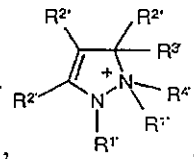
1-pyrazolinium



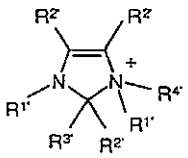
2-pyrazolinium



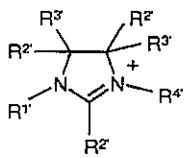
3-pyrazolinium



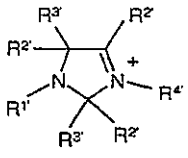
2,3-dihydroimidazolinium



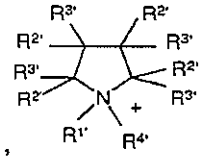
4,5-dihydroimidazolinium



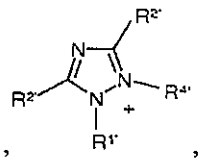
2,5-dihydroimidazolinium



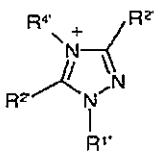
pyrrolidinium



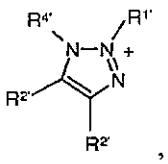
1,2,4-triazolium



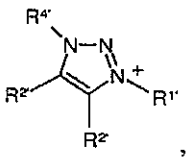
1,2,4-triazolium



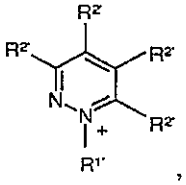
1,2,3-triazolium



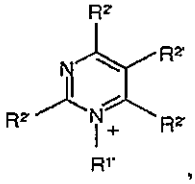
1,2,3-triazolium



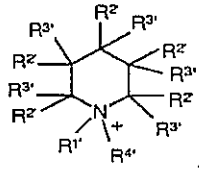
pyridazinium



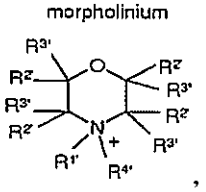
pyrimidinium



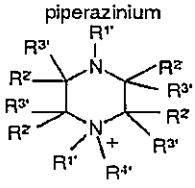
piperidinium



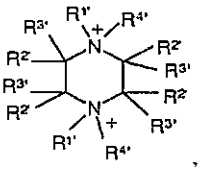
morpholinium



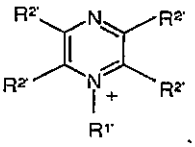
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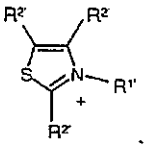
piperazinium



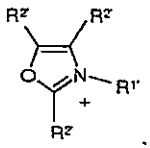
pyrazinium



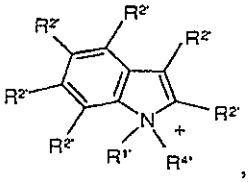
thiazolium



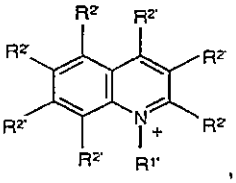
oxazolium



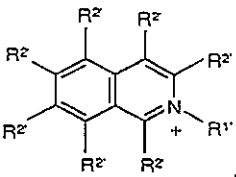
indolium



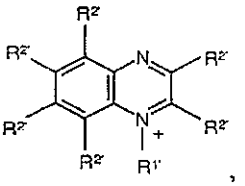
quinolinium



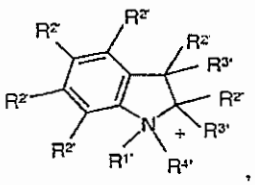
isoquinolinium



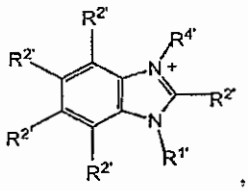
quinoxalinium



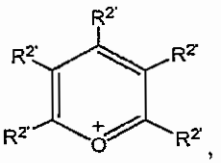
indolinium



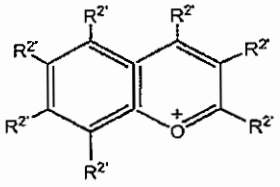
benzimidazolium



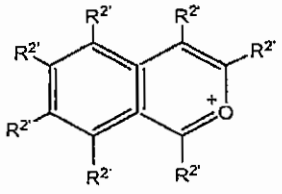
Pyrylium



Chromylium (1-Benzopyrylium)



Isochromylium (2-Benzopyryllium)



and

12. A compound according to claim 3, in which Kt^{z+} denotes

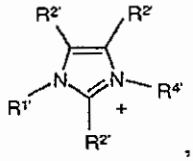
a heterocyclic cation of formula (8)

$$[HetN]^{z+} \qquad (8)$$

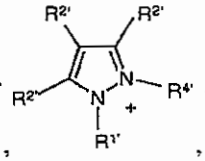
which

$[HetN]^{z+}$ denotes a heterocyclic cation selected from the group consisting of

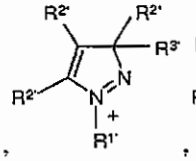
imidazolium



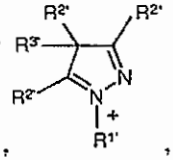
1H-pyrazolium



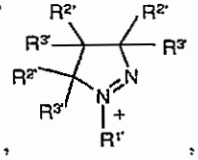
3H-pyrazolium



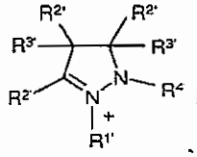
4H-pyrazolium



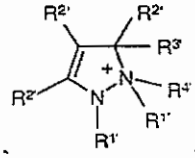
1-pyrazolinium



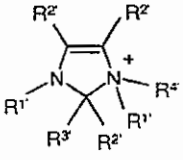
2-pyrazolinium



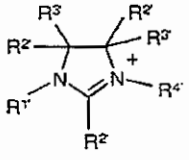
3-pyrazolinium



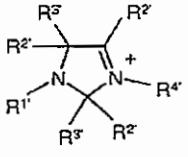
2,3-dihydroimidazolinium



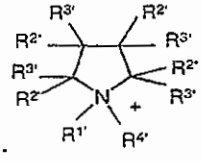
4,5-dihydroimidazolinium



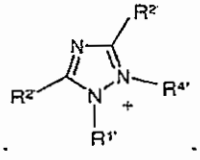
2,5-dihydroimidazolinium



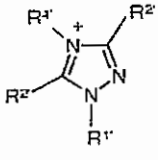
pyrrolidinium



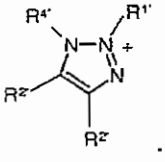
1,2,4-triazolium

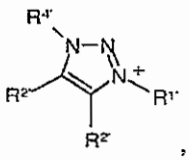
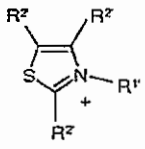
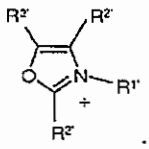


1,2,4-triazolium



1,2,3-triazolium



1,2,3-triazolium  , thiazolium  and oxazolium  .

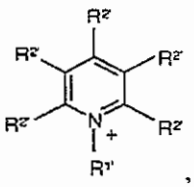
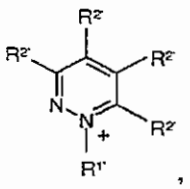
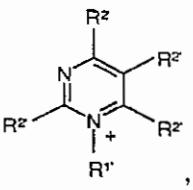
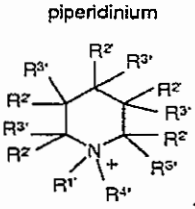
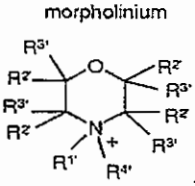
13. A compound according to claim 3, in which Kt^{z+} denotes

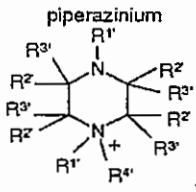
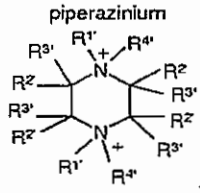
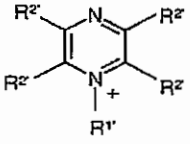
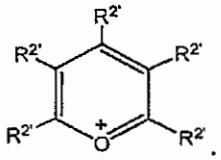
a heterocyclic cation of formula (8)

$$[HetN]^{z+} \qquad (8)$$

which

$[HetN]^{z+}$ denotes a heterocyclic cation selected from the group consisting of

pyridinium  , pyridazinium  , pyrimidinium  , piperidinium  , morpholinium  ,

piperazinium  , piperazinium  , pyrazinium  and Pyrylium  .

14. A compound according to claim 3, in which Kt^{z+} denotes

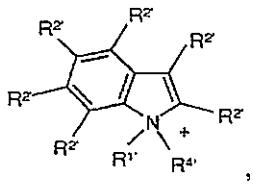
a heterocyclic cation of formula (8)

$$[HetN]^{z+} \qquad (8)$$

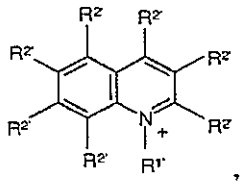
which

$[HetN]^{z+}$ denotes a heterocyclic cation selected from the group consisting of

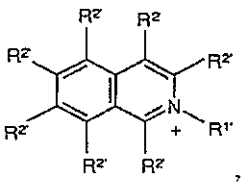
indolium



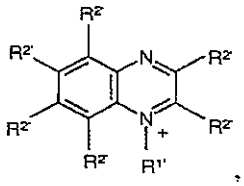
quinolinium



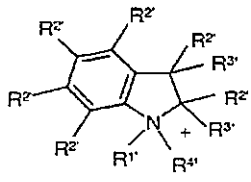
isoquinolinium



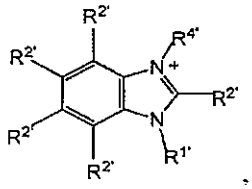
quinoxalinium



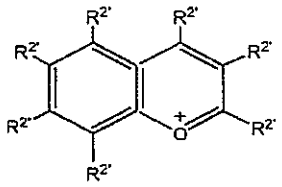
indolinium



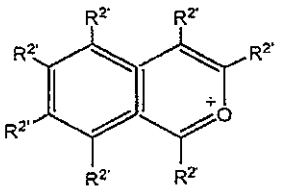
benzimidazolium



Chromylium (1-Benzopyrylium)



Isochromylium (2-Benzopyrylium)



and