C L A I M S

1. A process for preparing an alkylate, comprising:
- contacting in a reaction zone a hydrocarbon mixture comprising at least isoparaffin and an olefin with an acidic ionic liquid catalyst under alkylation conditions to obtain an alkylate;
- withdrawing an alkylate-comprising effluent from the reaction zone;
- separating at least part of the alkylate-comprising effluent into an hydrocarbon-rich phase and an ionic liquid catalyst-rich phase;
- fractionating part of the hydrocarbon-rich phase into at least an alkylate-comprising product and a isoparaffin-comprising stream;
- mixing another part of the hydrocarbon-rich phase with an olefin-comprising stream to form the hydrocarbon mixture; and
- providing the hydrocarbon mixture to the reaction zone.

2. A process according to claim 1, wherein separating at least part of the alkylate-comprising effluent into an hydrocarbon-rich phase and an ionic liquid catalyst-rich phase, comprises providing the at least part of the alkylate-comprising effluent to a centrifugal separator and separating the alkylate-comprising effluent under influence of centrifugal forces.

3. A process according to claim 1 or 2, wherein the reaction zone comprises two or more sections and the hydrocarbon mixture is provided to a first section, wherein a separate olefin-comprising stream is provided

to subsequent reaction zones by inter-staged feeding of separate olefin-comprising streams.

4. A process according to claim 1 or 2, wherein the reaction zone comprises two or more sections and at least part of the hydrocarbon mixture is provided to each section by inter-staged feeding of hydrocarbon mixture.

5. process according to any one of the preceding claims, wherein at least part of the acid ionic liquid catalyst-rich phase is recycled to the reaction zone.

6. A process according to any one of the preceding claims, wherein the hydrocarbon mixture comprises isoparaffins and olefins in an isoparaffin to olefins molar ratio of at least 20:1, preferably at least 50:1, more preferably at least 100:1, even more preferably in the range of from 100:1 to 200:1.

7. A process according to any one of the preceding claims, wherein isoparaffin is provided to process separately as part of the olefin-comprising stream, preferably as part of the olefin-comprising stream.

8. A process according to claim 7, wherein isoparaffin and olefin are provided to the process in an isoparaffin to olefin molar ratio in the range of from 1:1 to 40:1, preferably 1:1 to 20:1.

9. A process according to any one of the preceding claims, wherein the isoparaffin is isobutane and/or isopentane.

10. A process according to any one of the preceding claims wherein the olefin-comprising stream comprises an olefin comprising in the range of from 3 to 6 carbon atoms, preferably 4 or 5 carbon atoms.

11. Process according to any one of the preceding claims, wherein the acidic ionic liquid catalyst is a composite ionic liquid comprising of cations derived from

a hydrohalide of an alkyl-containing amine or pyridine, anions being composite coordinate anions derived from two or more metal halides, wherein at least one metal halide is an aluminium halide and any further metal halide is a halide of a metal selected from the group consisting of Group IB elements of the Periodic Table, Group IIB elements of the Periodic Table and transition elements of the Periodic Table.

12. A process according to claim 11, wherein to the catalyst comprises aluminium chloride and copper (I) chloride or copper (II) chloride.

CLAIMS

1. A process for preparing an alkylate, comprising:

- contacting in a reaction zone a hydrocarbon mixture comprising at least an isoparaffin and an olefin with an acidic ionic liquid catalyst under alkylation conditions to obtain an alkylate;

- withdrawing an alkylate-comprising effluent from the reaction zone;

- separating at least part of the alkylate-comprising effluent into a hydrocarbon-rich phase and an ionic liquid catalyst-rich phase;

- fractionating part of the hydrocarbon-rich phase into at least an alkylate-comprising product and an isoparaffin-comprising stream;

- mixing another part of the hydrocarbon-rich phase with an olefin-comprising stream to form the hydrocarbon mixture; and

- providing the hydrocarbon mixture to the reaction zone;

wherein the reaction zone comprises two or more sections and the hydrocarbon mixture is provided to a first section, wherein a separate olefin-comprising stream is provided to subsequent reaction zones by inter-staged feeding of separate olefin-comprising streams.

2. A process according to claim 1, wherein separating at least part of the alkylate-comprising effluent into a hydrocarbon-rich phase and an ionic liquid catalyst-rich phase, comprises providing the at least part of the alkylate-comprising effluent to a centrifugal separator and separating

the alkylate-comprising effluent under influence of centrifugal forces.

3. A process according to claim 1 or 2, wherein at least part of the hydrocarbon mixture is provided to each section of the reaction zone by inter-staged feeding of hydrocarbon mixture.

4. A process according to any one of the preceding claims, wherein at least part of the acid ionic liquid catalyst-rich phase is recycled to the reaction zone.

5. A process according to any one of the preceding claims, wherein the hydrocarbon mixture comprises isoparaffins and olefins in an isoparaffin to olefins molar ratio of at least 20:1.

6. A process according to any one of the preceding claims, wherein the hydrocarbon mixture comprises isoparaffins and olefins in an isoparaffin to olefins molar ratio of at least 50:1.

7. A process according to any one of the preceding claims, wherein the hydrocarbon mixture comprises isoparaffins and olefins in an isoparaffin to olefins molar ratio of at least 100:1.

8. A process according to any one of the preceding claims, wherein the hydrocarbon mixture comprises isoparaffins and olefins in an isoparaffin to olefins molar ratio of in the range of from 100:1 to 200:1.

9. A process according to any one of the preceding claims, wherein isoparaffin is provided to the process separately as part of the olefin-comprising stream.

10. A process according to claim 9, wherein isoparaffin and olefin are provided to the process in an isoparaffin to olefin molar ratio in the range of from 1:1 to 40:1.

11. A process according to claim 9 or claim 10, wherein isoparaffin and olefin are provided to the process in an isoparaffin to olefin molar ratio in the range of from1:1 to 20:1.

12. A process according to any one of the preceding claims, wherein the isoparaffin is isobutane and/or isopentane.

13. A process according to any one of the preceding claims wherein the olefin-comprising stream comprises an olefin comprising in the range of from 3 to 6 carbon atoms.

14. A process according to any one of the preceding claims wherein the olefin-comprising stream comprises an olefin comprising 4 or 5 carbon atoms.

15. Process according to any one of the preceding claims, wherein the acidic ionic liquid catalyst is a composite ionic liquid comprising of cations derived from a hydrohalide of an alkyl-containing amine or pyridine, anions being composite coordinate anions derived from two or more metal halides, wherein at least one metal halide is an aluminium halide and any further metal halide is a halide of a metal selected from the group consisting of Group IB elements of the Periodic Table, Group IIB elements of the Periodic Table and transition elements of the Periodic Table.

16. A process according to claim 15, wherein the catalyst comprises aluminium chloride and copper (I) chloride or copper (II) chloride.

17. An alylate prepared by the process according to any one of the proceeding claims.