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 an isoparaffin and an olefin with an acidic ionic liquid catalyst under alkylation conditions to obtain an alkylate-comprising effluent, in which process:

- solids are formed in the reaction zone;
- a solids-comprising effluent comprising hydrocarbons and acidic ionic liquid is withdrawn from the reaction zone; and
- at least part of the solids-comprising effluent is treated to remove at least part of the solids to obtain a solids-depleted effluent.

2. A process according to claim 1, wherein at least part of the solids-depleted effluent is recycled to the reaction zone.

3. process according to claim 1 or 2, wherein the solids-comprising effluent is separated into a catalyst-rich phase and a hydrocarbon-rich phase and the catalyst-rich phase is treated to remove solids.

4. A process according to any one of the preceding claims, wherein the solids-comprising effluent is the alkylate-comprising effluent.

5. A process according to any one of the preceding claims, wherein solids are removed from the reaction zone to an extent that the reaction zone comprises at most 5wt% of solids, preferably at most 2wt% of solids, more preferably in the range of from 0.1 to 2wt% of solids based on the total weight of the acidic ionic liquid catalyst in the reaction zone.

6. A process according to any one of the preceding claims, wherein at least part of the acidic ionic liquid catalyst in the solids-comprising effluent is rejuvenated by addition of hydrogen chloride and recycled to the reaction zone.

7. A process according to claim 6, wherein subsequent to the addition of hydrogen chloride the acidic ionic liquid catalyst with added hydrogen chloride is mixed with a spent acidic ionic liquid catalyst-comprising stream.

8. A process according to any one of the preceding claims, wherein solids are removed from the at least part of solids-comprising effluent at a temperature in the range of from 5 to 80°C, preferably 30 to 60°C.

9. A process according to any one of the preceding claims, wherein at least part of the alkylate-comprising effluent is fractionated to obtain an alkylate-comprising product.

10. A process according to any one of the preceding claims, wherein hydrocarbon mixture comprises isobutane and/or isopentane.

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

12. A process for treating an acidic ionic liquid comprising at least 0.1wt% of solids based on the total weight of the acidic ionic liquid, wherein the acidic ionic liquid comprising solids was used as a catalyst in an alkylation reaction and at least part of the solids are removed from the acidic ionic liquid.

13. 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.

14. A process according to claim 13, wherein to the catalyst comprises aluminium chloride and copper (I) chloride or copper (II) chloride.

15. Process according to any one of the preceding claims, wherein the solids are removed from the solids-comprising effluent by filtration, precipitation and/or centrifugation processes.

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-comprising effluent, in which process:

- solids are formed in the reaction zone;

- a solids-comprising effluent comprising hydrocarbons and acidic ionic liquid is withdrawn from the reaction zone;

- the solids-comprising effluent is separated into a catalyst-rich phase and a hydrocarbon-rich phase;

- at least part of the catalyst-rich phase of the solids-comprising effluent is treated to remove at least part of the solids in the form of a slurry of solids to obtain a solids-depleted effluent; and

- at least part of the solids-depleted effluent is recycled to the reaction zone;

wherein solids are removed from the reaction zone to an extent that the reaction zone comprises at most 5wt% of solids based on the total weight of the acidic ionic liquid catalyst in the reaction zone.

2. A process according to claim 1, wherein the solids-comprising effluent is the alkylate-comprising effluent.

3. A process according to claim 1 or claim 2, wherein solids are removed from the reaction zone to an extent that the reaction zone comprises at most 2wt% of solids based on the

total weight of the acidic ionic liquid catalyst in the reaction zone.

4. A process according to any one of the preceding claims, wherein solids are removed from the reaction zone to an extent that the reaction zone comprises in the range of from 0.1 to 2wt% of solids based on the total weight of the acidic ionic liquid catalyst in the reaction zone.

5. A process according to any one of the preceding claims, wherein at least part of the acidic ionic liquid catalyst in the solids-comprising effluent is rejuvenated by addition of hydrogen chloride and recycled to the reaction zone.

6. A process according to claim 5, wherein subsequent to the addition of hydrogen chloride the acidic ionic liquid catalyst with added hydrogen chloride is mixed with a spent acidic ionic liquid catalyst-comprising stream.

7. A process according to any one of the preceding claims, wherein solids are removed from the at least part of solids-comprising effluent at a temperature in the range of from 5 to 80^{0}C.

8. A process according to any one of the preceding claims, wherein solids are removed from the at least part of solids-comprising effluent at a temperature in the range of from 30 to 60^{0}C.

9. A process according to any one of the preceding claims, wherein at least part of the alkylate-comprising effluent is fractionated to obtain an alkylate-comprising product.

10. A process according to any one of the preceding claims, wherein hydrocarbon mixture comprises isobutane and/or isopentane.

11. A process according to any one of the preceding claims wherein the hydrocarbon mixture comprises an olefin comprising in the range of from 3 to 6 carbon atoms.

12. A process according to any one of the preceding claims wherein the hydrocarbon mixture comprises an olefin comprising 4 or 5 carbon atoms.

13. A 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.

14. A process according to claim 13, wherein the catalyst comprises aluminium chloride and copper (I) chloride or copper (II) chloride.

15. A process according to any one of the preceding claims, wherein the solids are removed from the solids-comprising effluent by filtration, precipitation and/or centrifugation processes.

16. An alkylate prepared by the process according to any one of the preceding claims.