Claims

1. A process for preparing polymeric, ionic compounds comprising imidazolium groups (polymeric, ionic imidazolium compounds for short), wherein

   - an α-dicarbonyl compound,
   - an aldehyde,
   - at least one amino compound having at least two primary amino groups,
   - if appropriate an amino compound having only one primary amino group and a
   - protic acid,

   where the carbonyl groups of the α-dicarbonyl compound and of the aldehyde may, if appropriate, also be present as hemiacetal, acetal or hemiketal or ketal,

   are reacted with one another.

2. The process according to claim 1, wherein the α-dicarbonyl compound is a compound of the formula I

   R1-CO-CO-R2

   where R1 and R2 are each, independently of one another, an H atom or an organic radical having from 1 to 20 carbon atoms.

3. The process according to claim 1 or 2, wherein the α-dicarbonyl compound is glyoxal.

4. The process according to any of claims 1 to 3, wherein the aldehyde is an aldehyde of the formula II

   R3-CHO

   where R3 is an H atom or an organic radical having from 1 to 20 carbon atoms.

5. The process according to any of claims 1 to 4, wherein the aldehyde is formaldehyde.

6. The process according to any of claims 1 to 5, wherein the amino compound is a compound of the formula III

   $(NH2-)_n$ R4

where n is an integer greater than or equal to 2 and R4 is any n-valent organic radical.

7. The process according to any of claims 1 to 6, wherein the amino compound is an aliphatic or aromatic diamine or triamine.

8. The process according to any of claims 1 to 7, wherein the amino compound is a C2-C20-alkylenediamine.

9. The process according to any of claims 1 to 8, wherein a mixture of different amino compounds is used as amino compound.

10. The process according to any of claims 1 to 9, wherein the protic acid is an acid of the formula $Y^{m-}(H^+)_m$, where m is an integer.

11. The process according to claim 10, wherein m is an integer from 1 to 4.

12. The process according to any of claims 1 to 11, wherein the protic acid is an acid with a pK_a greater than 1.

13. The process according to any of claims 1 to 12, wherein the protic acid is a carboxylic acid, sulfonic acid, phosphoric acid or phosphonic acid, where the acid groups of the sulfonic acid, phosphoric acid or phosphonic acid can be partially esterified.

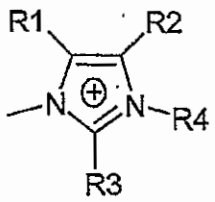
14. The process according to any of claims 1 to 13, wherein the protic acid is acetic acid.

15. The process according to any of claims 1 to 14, wherein the process is carried out in water, in a water-miscible solvent or a mixture thereof.

16. A polymeric, ionic imidazolium compound which can be obtained by a process according to any of claims 1 to 15, wherein less than 50 mol% of the amino compounds used are compounds having a hydroxyl group in the ß position relative to the primary amino group and the anionic counterion to the cationic polymer is not bromide.

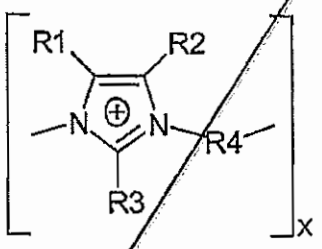
17. The polymeric, ionic imidazolium compound according to claim 16, wherein the number average molecular weight Mn, determined by gel permeation chromatography, is greater than 500.

18. A polymeric, ionic imidazolium compound in which the cationic imidazolium polymer comprises structural units of the formula IV



where R1, R2, R3 and R4 are as defined above, with the exception that R4 here is an (n-1)-valent organic radical which does not comprise a hydroxyl group in the ß position relative to the nitrogen atom of the imidazole ring and the associated anions are not bromide.

19. A linear, polymeric, ionic imidazolium compound in which the cationic imidazolium polymer comprises structural units of the formula V



where x is an integer, R1, R2 and R3 and R4 are as defined above, with the exception that R4 here is a divalent organic radical which does not comprise a hydroxyl group in the ß position relative to the nitrogen atom of the imidazole ring and the associated anions are not bromide.

20. A polymeric, ionic imidazolium compound according to claim 18 or 19, wherein the cationic imidazolium polymer comprises more than 80% by weight of structural units of the formula IV or V.

21. The use of the polymeric, ionic imidazolium compound according to any of claims 1 to 20 as dispersant.

Claims

1. A process for preparing polymeric, ionic compounds comprising imidazolium groups (polymeric, ionic imidazolium compounds for short), wherein
- an α-dicarbonyl compound,
- an aldehyde
- at least one amino compound having at least two primary amino groups.
and a
- protic acid are reacted with one another.

2. The process according to claim 1, wherein the compounds employed in the process further comprise an amino compound having only one primary amino group.

3. The process according to claim 1 or claim 2, wherein the carbonyl groups of the α-dicarbonyl compound and of the aldehyde are present as hemiacetal, acetal or hemiketal or ketal.

4. The process according to any one of the preceding claims, wherein the α-dicarbonyl compound is a compound of the formula I

R1-CO-CO-R2

where R1 and R2 are each, independently of one another, an H atom or an organic radical having from 1 to 20 carbon atoms.

5. The process according to any one of the preceding claims, wherein the α-dicarbonyl compound is glyoxal.

6. The process according to any one of the preceding claims, wherein the aldehyde is an aldehyde of the formula II

R3-CHO

where R3 is an H atom or an organic radical having from 1 to 20 carbon atoms.

7. The process according to any one of the preceding claims, wherein the aldehyde is formaldehyde.

8. The process according to any one of the preceding claims, wherein the amino compound is a compound of the formula III.

$(NH2-)_n$ R4

where n is an integer greater than or equal to 2 and R4 is any n-valent organic radical.

9. The process according to any one of the preceding claims, wherein the amino compound is an aliphatic or aromatic diamine or triamine.

10. The process according to any one of the preceding claims, wherein the amino compound is a C2-C20-alkylenediamine.

11. The process according to any one of the preceding claims, wherein a mixture of different amino compounds is used as amino compound.

12. The process according to any one of the preceding claims, wherein the protic acid is an acid of the formula $Y^{m-}(H^+)_m$, where m is an integer.

13. The process according to claim 12, wherein m is an integer from 1 to 4.

14. The process according to any one of the preceding claims, wherein the protic acid is an acid with a pK_a greater than 1.

15. The process according to any one of the preceding claims, wherein the protic acid is a carboxylic acid, sulfonic acid, phosphoric acid or phosphonic acid, where the acid groups of the sulfonic acid, phosphoric acid or phosphonic acid can be partially esterified.

16. The process according to any one of the preceding claims, wherein the protic acid is acetic acid.

17. The process according to any one of the preceding claims, wherein the process is carried out in water, in a water-miscible solvent or a mixture thereof.