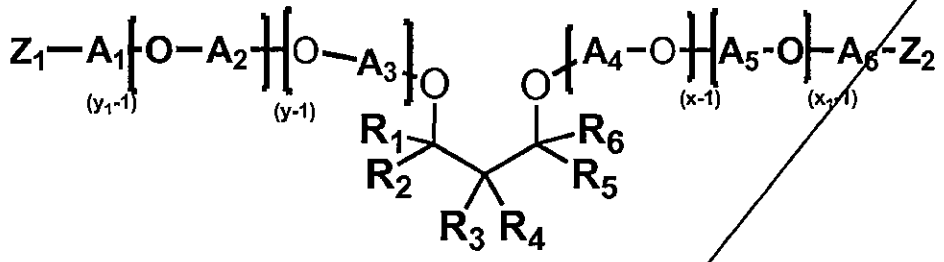
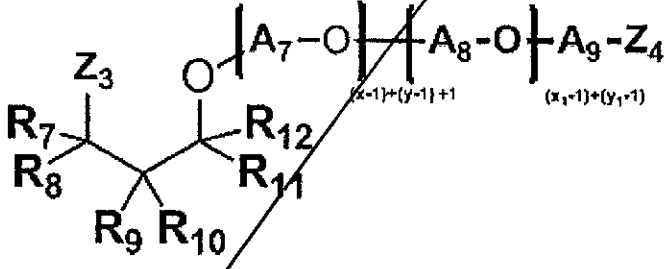
Claims:

1. An etheramine mixture comprising at least 90% by weight, based on the total weight of the etheramine mixture, of an amine of Formula (I) and/or (II),



Formula (I)



Formula (II)

wherein R_1-R_{12} are independently selected from H, alkyl, cycloalkyl, aryl, alkylaryl, or arylalkyl, wherein at least one of R_1-R_6 and at least one of R_7-R_{12} is different from H,
wherein A_1-A_9 are independently selected from linear or branched alkylenes having 2 to 18 carbon atoms, preferably 2-10 carbon atoms, most preferably 2-5 carbon atoms,
wherein Z_1-Z_4 are independently selected from OH, NH_2, NHR' or NR'R", wherein at least one of Z_1-Z_2 and at least one of Z_3-Z_4 is NH_2, NHR' or NR'R", wherein R' and R" are independently selected from alkylenes having 2 to 6 carbon atoms and wherein the sum of x+y is in the range of from 2 to 200, wherein $x \geq 1$ and $y \geq 1$; and $x_1 + y_1$ is in the range of from 2 to 200, preferably 2-20, most preferaby 2-10, wherein $x_1 \geq 1$ and $y_1 \geq 1$.

2. The etheramine mixture according to claim 1, wherein the etheramine mixture comprises at least 95% by weight, based on the total weight of the etheramine mixture, of the amine of Formula (I) and/or (II).

3. The etheramine mixture according to claim 1 or 2, wherein in said polyetheramine of Formula (I) or Formula (II), x+y is in the range of from 2 to 20.

4. The etheramine mixture according to any one of claims 1 to 3, wherein in said polyetheramine of Formula (I) or Formula (II), x+y is in the range of from 3 to 20.

5. The etheramine mixture according to any one of claims 1 to 4, wherein in said polyetheramine of Formula (I) or Formula (II), the degree of amination lies in the range of 60% to 100%.

5. The etheramine mixture according to any one of claims 1 to 4, wherein in said polyetheramine of Formula (I) or Formula (II), A_1-A_9 are independently selected from the group consisting of ethylene, propylene, or butylene.

6. The etheramine mixture according to any one of claims 1 to 4, wherein in said polyetheramine of Formula (I) or Formula (II), each of A_1-A_9 is propylene.

7. The etheramine mixture according to any one of claims 1 to 6, wherein in said polyetheramine of Formula (I) or Formula (II), R_1, R_2, R_5, R_6, R_7, R_8, R_{11}, and R_{12} are H and R_3, R_4, R_9, and R_{10} are independently selected from C1-16 alkyl or aryl.

8. The etheramine mixture according to any one of claims 1 to 6, wherein in said polyetheramine of Formula (I) or Formula (II), R_1, R_2, R_5, R_6, R_7, R_8, R_{11}, and R_{12} are H and R_3, R_4, R_9, and R_{10} are independently selected from a butyl group, an ethyl group, a methyl group, a propyl group, or a phenyl group.

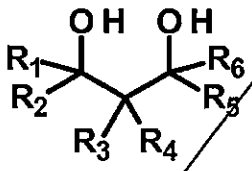
9. The etheramine mixture according to any one of claims 1 to 6, wherein in said polyetheramine Formula (I) or Formula (II), R_3 and R_9 are each an ethyl group, R_1, R_2, R_5 R_6, R_7, R_8, R_{11}, R_{12} are each H, R_4 and R_{10} are each a butyl group.

10. The etheramine mixture according to any one of claims 1 to 9, wherein the polyetheramine of Formula (I) or Formula (II) has a weight average molecular weight of about 290 to about 1000 grams/mole.

11. The etheramine mixture according to any one of claims 1 to 9, wherein the polyetheramine of Formula (I) or Formula (II) is reacted with an acid.

12. A process for the manufacture of an etheramine mixture comprising at least 90% by weight, based on the total weight of the etheramine mixture, of an etheramine of Formula (I) and/or (II) comprising the following steps:

a) reacting a 1,3-diol of Formula (III) with C_2-C_{18} alkylene oxides, wherein the molar ratio of 1,3-diol to C_2-C_{18} alkylene oxides is in the range of 1:2 to 1:10,



(III)

wherein R_1-R_6 are independently of one another H, alkyl, cycloalkyl, aryl, alkylaryl, arylalkyl and at least one group selected from R_1-R_6 is different from H,

b) aminating the alkoxylated 1, 3- diols with ammonia.

13. The process according to claim 12, wherein the molar ratio of 1,3- diol to C_2-C_{18} alkylene oxides is in the range of 1:3 to 1:8.

14. The process according to claim 12 or 13, wherein the molar ratio of 1,3-diol to C_2-C_{18} alkylene oxides is in the range of 1:4 to 1:6.

15. The process according to any one of claims 12 to 14, wherein the C_2-C_{18} alkylene oxides are selected from the group consisting of ethylene oxide, propylene oxide, butylene oxide or a mixture thereof.

16. The process according to any one of claims 12 to 14, wherein the C_2-C_{18} alkylene oxide is propylene oxide.

17. The process according to any one of claims 12 to to 16, wherein the 1,3-diol of formula (III) is selected from the group consisting of 2-butyl-2-ethyl-1,3-propanediol, 2-methyl-2-propyl-1,3-propanediol, 2-methyl-2-phenyl-1,3-propanediol, 2,2-dimethyl-1,3-propandiol, 2-ethyl-1,3-hexandiol.

18. The process according to any one of claims 12 to 17, wherein the amination is carried out in the presence of copper-, nickel- or cobalt-containing catalyst.

19. The process according to claim 18, wherein the catalytically active material of the catalysts, before the reduction thereof with hydrogen, comprises oxygen compounds of aluminum, of copper, of nickel and of cobalt, and in the range from 0.2 to 5.0% by weight of oxygen compounds of tin, calculated as SnO.

20. Use of the etheramine mixture of claims 1 to 11 in personal care.

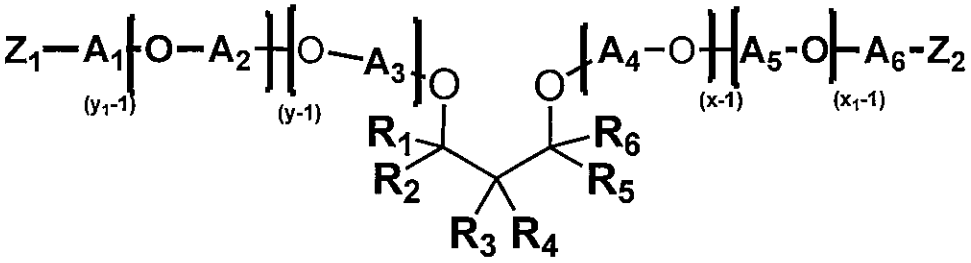
21. Use of the etheramine mixture of claims 1 to 11 in shampoo and body wash formulations.

22. Use of the etheramine mixture of Claims 1 to 11 as curing agent for epoxy resins or as a reactant in the production of polymers.

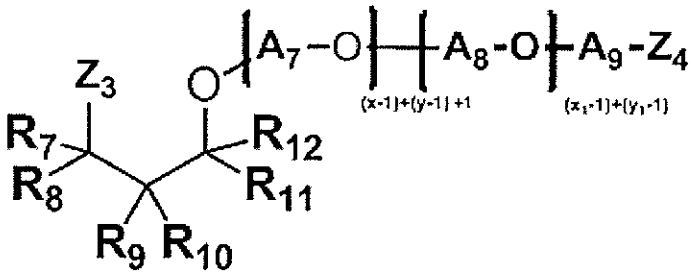
23. Use of the etheramine mixture of Claims 1 to 11 in polyurethanes, polyureas, and as thermoplastic polyamide adhesives.

Claims:

1. An etheramine mixture comprising at least 90% by weight, based on the total weight of the etheramine mixture, of an amine of Formula (I) and (II),



Formula (I)



Formula (II)

wherein R_1-R_{12} are independently selected from H, alkyl, cycloalkyl, aryl, alkylaryl, or arylalkyl, wherein at least one of R_1-R_6 and at least one of R_7-R_{12} is different from H,
wherein A_1-A_9 are independently selected from linear or branched alkylenes having 2 to 18 carbon atoms, preferably 2-10 carbon atoms, most preferably 2-5 carbon atoms,
wherein Z_1-Z_4 are independently selected from OH, NH_2, NHR' or NR'R", wherein at least one of Z_1-Z_2 and at least one of Z_3-Z_4 is NH_2, NHR' or NR'R", wherein R' and R" are independently selected from alkylenes having 2 to 6 carbon atoms and wherein the sum of x+y is in the range of from 2 to 200, wherein $x \geq 1$ and $y \geq 1$; and $x_1 + y_1$ is in the range of from 2 to 200, preferably 2-20, most preferaby 2-10, wherein $x_1 \geq 1$ and $y_1 \geq 1$, and wherein in said polyetheramine of Formula (I) or Formula (II), x+y is in the range of from 3 to 20.

2. The etheramine mixture according to claim 1, wherein the etheramine mixture comprises at least 95% by weight, based on the total weight of the etheramine mixture, of the amine of Formula (I) and (II).

3. The etheramine mixture according to any one of claims 1 or 2, wherein in said polyetheramine of Formula (I) or Formula (II), the degree of amination lies in the range of 60% to 100%.

4. The etheramine mixture according to any one of claims 1 to 2, wherein in said polyetheramine of Formula (I) or Formula (II), A_1-A_9 are independently selected from the group consisting of ethylene, propylene, or butylene.

5. The etheramine mixture according to any one of claims 1 to 2, wherein in said polyetheramine of Formula (I) or Formula (II), each of A_1-A_9 is propylene.

6. The etheramine mixture according to any one of claims 1 to 5, wherein in said polyetheramine of Formula (I) or Formula (II), R_1, R_2, R_5, R_6, R_7, R_8, R_{11}, and R_{12} are H and R_3, R_4, R_9, and R_{10} are independently selected from C1-16 alkyl or aryl.

7. The etheramine mixture according to any one of claims 1 to 5, wherein in said polyetheramine of Formula (I) or Formula (II), R_1, R_2, R_5, R_6, R_7, R_8, R_{11}, and R_{12} are H and R_3, R_4, R_9, and R_{10} are independently selected from a butyl group, an ethyl group, a methyl group, a propyl group, or a phenyl group.

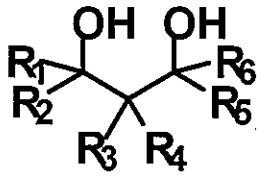
8. The etheramine mixture according to any one of claims 1 to 5, wherein in said polyetheramine Formula (I) or Formula (II), R_3 and R_9 are each an ethyl group, R_1, R_2, R_5 R_6, R_7, R_8, R_{11}, R_{12} are each H, R_4 and R_{10} are each a butyl group.

9. The etheramine mixture according to any one of claims 1 to 8, wherein the polyetheramine of Formula (I) or Formula (II) has a weight average molecular weight of about 290 to about 1000 grams/mole.

10. The etheramine mixture according to any one of claims 1 to 8, wherein the polyetheramine of Formula (I) or Formula (II) is reacted with an acid.

11. A process for the manufacture of an etheramine mixture comprising at least 90% by weight, based on the total weight of the etheramine mixture, of an etheramine of Formula (I) and (II) comprising the following steps:

a) reacting a 1,3-diol of Formula (III) with C_2-C_{18} alkylene oxides, wherein the molar ratio of 1,3-diol to C_2-C_{18} alkylene oxides is in the range of 1:2 to 1:10,



(III)

wherein R_1-R_6 are independently of one another H, alkyl, cycloalkyl, aryl, alkylaryl, arylalkyl and at least one group selected from R_1-R_6 is different from H,

b) aminating the alkoxylated 1, 3- diols with ammonia.

12. The process according to claim 11, wherein the molar ratio of 1,3- diol to C_2-C_{18} alkylene oxides is in the range of 1:3 to 1:8.

13. The process according to claim 11 or 12, wherein the molar ratio of 1,3-diol to C_2-C_{18} alkylene oxides is in the range of 1:4 to 1:6.

14. The process according to any one of claims 11 to 13, wherein the C_2-C_{18} alkylene oxides are selected from the group consisting of ethylene oxide, propylene oxide, butylene oxide or a mixture thereof.

15. The process according to any one of claims 11 to 14, wherein the C_2-C_{18} alkylene oxide is propylene oxide.

16. The process according to any one of claims 11 to 15, wherein the 1,3-diol of formula (III) is selected from the group consisting of 2-butyl-2-ethyl-1,3-propanediol, 2-methyl-2-propyl-1,3-propanediol, 2-methyl-2-phenyl-1,3-propanediol, 2,2-dimethyl-1,3-propandiol, 2-ethyl-1,3-hexandiol.

17. The process according to any one of claims 11 to 16, wherein the amination is carried out in the presence of copper-, nickel- or cobalt-containing catalyst.

18. The process according to claim 17, wherein the catalytically active material of the catalysts, before the reduction thereof with hydrogen, comprises oxygen compounds of aluminum, of cop-

per, of nickel and of cobalt, and in the range from 0.2 to 5.0% by weight of oxygen compounds of tin, calculated as SnO.

19. Use of the etheramine mixture of claims 1 to 10 in personal care.

20. Use of the etheramine mixture of claims 1 to 10 in shampoo and body wash formulations.