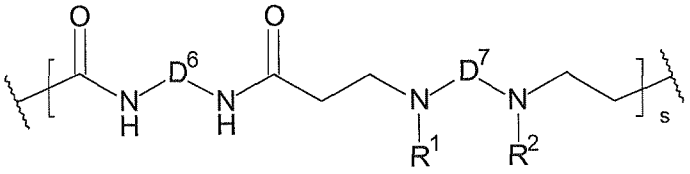
by hydroxyl, alkoxy or alkoxycarbonyl.

In a first aspect, there is provided an aqueous composition for metal electroplating, wherein the composition comprises a source of metal ions and at least one additive comprising at least one polyaminoamide, said polyaminoamide comprising the structural unit represented by formula I



(I)

or derivatives of the polyaminoamide of formula I obtainable by complete or partial protonation, N-functionalization or N-quaternization with a non-aromatic reactant,

wherein

D^6 is, for each repeating unit 1 to s independently, a divalent group selected from a saturated or unsaturated C_1-C_{20} organic radical,

D^7 is, for each repeating unit 1 to s independently, a divalent group selected from straight chain or branched C_2-C_{20} alkanediyl, which may optionally be interrupted by heteroatoms or divalent groups selected from O, S and NR^{10},

R^1 is, for each repeating unit 1 to s independently, selected from H, C_1-C_{10} alkyl, and C_1-C_{10} alkenyl, which may optionally be substituted by hydroxyl, alkoxy or alkoxycarbonyl, and

R^2 is, for each repeating unit 1 to s independently, selected from H, C_1-C_{10} alkyl, and C_1-C_{10} alkenyl, which may optionally be substituted by hydroxyl, alkoxy or alkoxycarbonyl, and

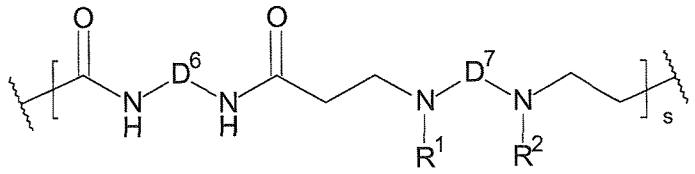
s is an integer from 1 to 250

R^{10} is selected from H, C_1-C_{20} alkyl, and C_1-C_{20} alkenyl, which may optionally be substituted by hydroxyl, alkoxy or alkoxycarbonyl.

In a second aspect, there is provided the use of polyaminoamides as described herein in a bath for depositing metal containing layers.

Claims

1. An aqueous composition for metal electroplating, wherein the composition comprises a source of metal ions and at least one additive comprising at least one polyaminoamide, said polyaminoamide comprising the structural unit represented by formula I



(I)

or derivatives of the polyaminoamide of formula I obtainable by complete or partial protonation, N-functionalization or N-quaternization with a non-aromatic reactant,

wherein

D^6 is, for each repeating unit 1 to s independently, a divalent group selected from a saturated or unsaturated C_1-C_{20} organic radical,

D^7 is, for each repeating unit 1 to s independently, a divalent group selected from straight chain or branched C_2-C_{20} alkanediyl, which may optionally be interrupted by heteroatoms or divalent groups selected from O, S and NR^{10},

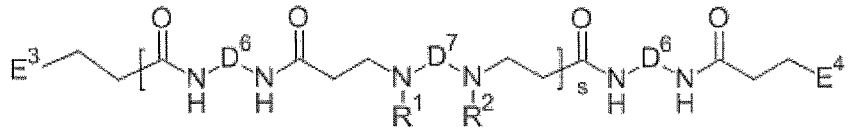
R^1 is, for each repeating unit 1 to s independently, selected from H, C_1-C_{10} alkyl, and C_1-C_{10} alkenyl, which may optionally be substituted by hydroxyl, alkoxy or alkoxycarbonyl, and

R^2 is, for each repeating unit 1 to s independently, selected from H, C_1-C_{10} alkyl, and C_1-C_{10} alkenyl, which may optionally be substituted by hydroxyl, alkoxy or alkoxycarbonyl, and

s is an integer from 1 to 250

R^{10} is selected from H, C_1-C_{20} alkyl, and C_1-C_{20} alkenyl, which may optionally be substituted by hydroxyl, alkoxy or alkoxycarbonyl.

2. The aqueous composition according to claim 1, wherein the polyaminoamide is represented by formula IV



(IV)

wherein D^6, D^7, R^1, R^2, and s have the prescribed meanings and

E^3, E^4 are independently selected from

(a) NH-C_1-C_{20}-alkyl or NH-C_1-C_{20}-alkenyl,

(b) N-(C_1-C_{20}-alkyl)$_2$ or N-(C_1-C_{20}-alkenyl)$_2$ or N-(C_1-C_{20}-alkyl)(C_1-C_{20}-alkenyl)

(c) NR^1-D^7-NR^2H, or

(d) NR^2-D^7-NR^2-CH_2-CH_2-CO-NH-(C_1-C_{20}-alkyl) or NR^2-D^7-NR^2-CH_2-CH_2-CO-NH-(C_1-C_{20}-alkenyl).

3. The aqueous composition according to claim 2, wherein E^3 and E^4 are independently selected from NR^1-D^7-NR^2H.

4. The aqueous composition according to anyone of the preceding claims, wherein the metal ions comprise copper ion.

5. The aqueous composition according to anyone of the preceding claims, wherein D^6 is, for each repeating unit 1 to s independently, selected from $(CH_2)_g$, wherein g is an integer from 1 to 6.

6. The aqueous composition according to anyone of the preceding claims, wherein D^7 is selected from straight chain C_2- to C_6-alkanediyl.

7. The aqueous composition according to anyone of the preceding claims, wherein s is an integer from 1 to 150, more preferably from 2 to 100, most preferably from 2 to 50.

8. The aqueous composition according to anyone of the preceding claims, wherein R^1 is selected from H, C_1-C_{10}-alkyl, C_1-C_{10}-alkenyl, which may optionally be substituted by hydroxyl, alkoxy or alkoxycarbonyl.

9. The aqueous composition according to anyone of the preceding claims, wherein R^2 is selected from H, C_1-C_{10}-alkyl, or C_1-C_{10}-alkenyl, which may optionally be substituted by hydroxyl, alkoxy or alkoxycarbonyl.

10. The aqueous composition according to anyone of the preceding claims, further comprising an accelerating agent.

11. The aqueous composition according to anyone of the preceding claims, further comprising a suppressing agent.

12. Use of a polyaminoamide of formula I as defined in anyone of the preceding claims in a bath for depositing metal containing layers.

13. A process for depositing a metal layer on a substrate by
a) contacting a metal plating bath comprising a composition as defined in any of claims 1 to 11 with the substrate, and
b) applying a current density to the substrate for a time sufficient to deposit a metal layer onto the substrate.

14. The process according to claim 13, wherein the substrate comprises micrometer or nanometer sized features and the deposition is performed to fill the micrometer or nanometer sized features.

15. The process according to claim 14, wherein the nanometer-sized features have a size from 1 to 1000 nm and/or an aspect ratio of 4 or more.