What is Claimed is:

1. A process for electrodeposition of copper on a dielectric or semiconductor base structure, comprising:

contacting a metalizing substrate comprising a seminal conductive layer on the base structure with an aqueous electrolytic deposition composition; and

supplying electrical current to the electrolytic deposition composition to deposit copper on the substrate;

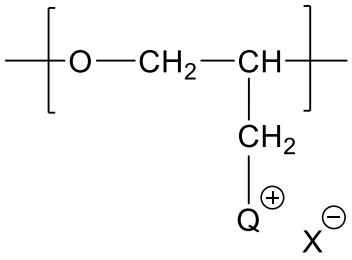
wherein the aqueous electrolytic composition comprises:

copper ions;

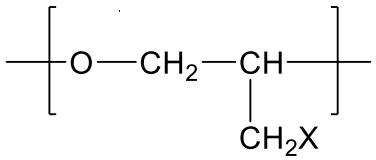
an acid;

a suppressor; and

a quaternized poly(epihalohydrin) comprising n repeating units corresponding to structure 1N and p repeating units corresponding to structure 1P:



(1N)



(1P)

wherein Q has a structure corresponding to that which is obtained by reacting a pendent methylene halide group of poly(epihalohydrin) with a tertiary amine selected from the group consisting of: (i) $NR_1R_2R_3$ wherein each of R_1, R_2 and R_3 is independently selected from the group consisting of substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or

unsubstituted alicyclic, substituted or unsubstituted aralkyl, substituted or unsubstituted aryl and substituted or unsubstituted heterocyclic, and wherein at least one of R_1, R_2 and R_3 is not a lower alkyl having between 1 and 3 carbon atoms; (ii) an N-substituted and optionally further substituted heteroalicyclic amine wherein the N-substituent is selected from the group consisting of substituted or unsubstituted alkyl, substituted or unsubstituted alicyclic, substituted or unsubstituted aralkyl, substituted or unsubstituted aryl, and substituted or unsubstituted heterocyclic; and (iii) a substituted or unsubstituted nitrogen-containing heteroaryl compound;

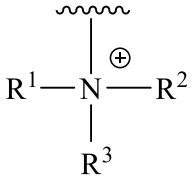
n is an integer between 3 and 35, p is an integer between 0 and 25;

X is a halo substituent; and

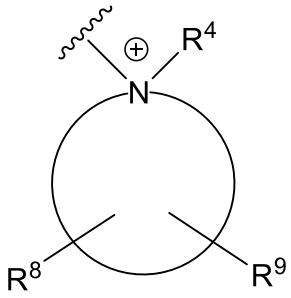
X^- is a monovalent anion.

2. The process as set forth in claim 1, wherein the aqueous electrolytic composition further comprises a polar organic solvent having a boiling point (neat) of at least 120°C.

3. A process as set forth in claim 1 wherein Q is selected from the group consisting of:

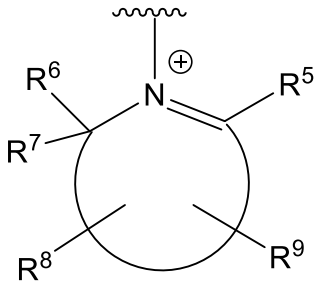


(IIA)



(IIB)

and



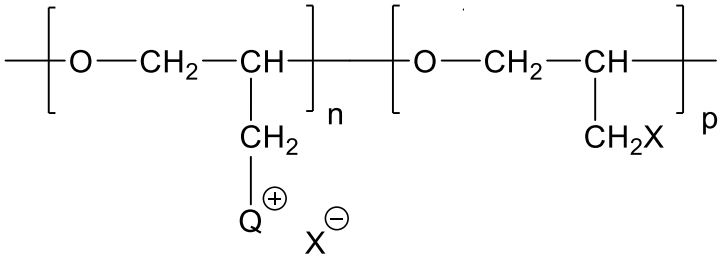
(IIC)

wherein: (i) structure IIB is an N-substituted heterocyclic moiety; (ii) structure IIC is a heterocyclic moiety; (iii) each of R^1, R^2, R^3 and R^4 is independently selected from the group consisting of substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted aralkyl, substituted or unsubstituted alicyclic, substituted or unsubstituted aryl, and substituted or unsubstituted heterocyclic; and (iv) each of R^5, R^6, R^7, R^8 and R^9 is independently selected from the group consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted aralkyl, substituted or unsubstituted alicyclic, and substituted or unsubstituted aryl, and substituted or unsubstituted heterocyclic.

4. A process as set forth in claim 1 wherein the quaternized poly(epihalohydrin) comprises additional repeating units comprising residues of at least one alkylene oxide.

5. A process as set forth in claim 4, wherein the residues of alkylene oxide are selected from the group consisting of ethylene oxide, propylene oxide, butylene oxide, 3,4-epoxy-1-butanol, 2,3-epoxy-1-propanol, glycidol, and combinations of one or more of the foregoing.

6. A process as set forth in claim 1, wherein repeating units of the poly(epihalohydrin) consist essentially of residues of epihalohydrin and residues of quaternized epihalohydrin corresponding to Structure (I):



(I)

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wherein the quaternized poly(epihalohydrin) repeating units and non-quaternized epihalohydrin repeating units in said quaternized poly(epihalohydrin) are arranged in a block, alternating or random configuration.

7. A process as set forth in claim 1, wherein Q corresponds to the structure that is obtained in reacting a pendent methylene halide group of poly(epihalohydrin) with a tertiary amine that comprises $NR_1R_2R_3$,

wherein one of R_1, R_2 and R_3 is selected from the group consisting of unsubstituted alkyl having more than three carbon atoms, hydroxyalkyl, dihydroxyalkyl, phenyl, hydroxyphenyl, dihydroxyphenyl, benzyl, hydroxyphenylmethyl and dihydroxyphenylmethyl, and each of the others of R_1, R_2 and R_3 is independently selected from lower alkyl having between 1 and 3 carbon atoms.

8. A process as set forth in claim 1, wherein Q has the structure which is obtained from reacting a pendent methylene chloride group of poly(epihalohydrin) with a quaternizing agent selected from the group consisting of 3-hydroxypropyldimethylamine, n-butyldimethylamine, di(3-hydroxypropyl)methylamine, 2,3-dihydroxypropyldimethylamine, 3-hydroxypropyldiethylamine, 2-hydroxypropyldimethylamine, 4-hydroxybutyldimethylamine, 2-hydroxyethyldimethylamine, n-propyldimethylamine, 2-hydroxyethoxyethyldimethylamine, di(2-hydroxyethyl)methylamine, benzyldimethylamine and 4-hydroxybenzyldimethylamine.

9. A process as set forth in claim 1, wherein Q corresponds to the structure that is obtained by reacting a pendent methylene chloride group of poly(epihalohydrin) with a tertiary amine selected from the group consisting of N-methylmorpholine, imidazole, 1-methylimidazole, 1-benzylimidazole, 2-imidazoline, 3-imidazoline, 2-dimethylamino-1-ethanol, and 4-ethylpyridine.