1. A copper electrolyte comprising:

a. a water soluble copper salt;
b. a complexant;
c. a leveler;
d. optionally a polar solvent;
e. optionally, a pH adjuster; and
f. balance water,

wherein the copper electrolyte has a pH in the range of 8 to 11, preferably 8.2 to 9.5.

2. The copper electrolyte according to claim 1, wherein the water soluble copper salt comprises a copper (II) salt.

3. The copper electrolyte according to claim 2, wherein the copper (II) salt is selected from the group consisting of copper (II) sulfate, copper (II) chloride, and copper (II) acetate.

4. The copper electrolyte according to claim 2, wherein the copper (II) salt comprises copper (II) sulfate.

5. The copper electrolyte according to any of claims 1 to 4, wherein the complexant is selected from the group consisting of citric acid, tartaric acid, ethylenediaminetetraacetic acid (EDTA), N-(hydroxyethyl)-ethylenediaminetriacetic acid (HEDTA), ethylenediamine, 1,6 diamino-cyclohexane, diethylene-triamine, triethylene-tetramine, N,N,N,N-tetramethyl-ethylene-diamine, N,N-Bis(2-hydroxyethyl)ethylenediamine, N,N,N,N-tetrakis(2-hydroxyethyl)ethylenediamine, glycine, 2-amino-ethyl-phosphonic acid, salicylic acid, salicylhydroxamic acid, catechol, 1,2-dihydroxybenzene-4-sulfonic acid, acetylacetone, acetylacetonate, dimethylglyoxime and 1,3-diamino-propane.

6. The copper electrolyte according to any of claims 1 to 4, wherein the complexant comprises diethylenetriamine.

7. The copper electrolyte according to any of claims 1 to 4, wherein the leveler is selected from the group consisting of polyethylene imine and derivatives thereof, quaternized polyethylene imine, polyglycine, poly(allylamine), polyaniline, polyurea, polyacrylamide,

poly(melamine-co-formaldehyde), reaction products of amines with epichlorohydrin, reaction products of an amine, epichlorohydrin, and polyalkylene oxide, reaction products of an amine with a polyepoxide, polyvinylpyridine, and polyvinylimidazole.

8. The copper electrolyte according to any of claims 1 to 4, wherein the pH adjuster is selected from the group consisting of tetraethylammonium hydroxide and tetrabutylammonium hydroxide.

9. The copper electrolyte according to any of claims 1 to 4, wherein the polar solvent is present in the electrolyte and is selected from the group consisting of ethylene glycol, propylene glycol, glycerol, ethylene glycol monomethyl either, ethylene glycol monoethyl ether, ethylene glycol monopropyl ether, dipropylene glycol monomethyl ether and combinations of the foregoing.

10. The copper electrolyte according to claim 9, wherein the polar solvent is glycerol.

11. The copper electrolyte according to any of claims 1 to 4, comprising:

a. 40 to 80 g/L, more preferably 45 to 65 g/L, more preferably 50 to 60 g/L of the water soluble copper salt;
b. 4 to 20 g/L, more preferably 5 to 9 g/L, more preferably 4.5 to 7.5 g/L of the complexant; and
c. 15 to 25 g/L, more preferably 18 to 20 g/L of the leveler.

12. The copper electrolyte according to claim 9, comprising:

a. 2 to 25 g/L, more preferably 3 to 10 g/L, more preferably 4 to 8 g/L of the water soluble copper salt;
b. 0.1 to 2.0 g/L, more preferably 0.2 to 1.2 g/L, more preferably 0.4 to 0.8 g/L of the complexant;
c. 2 to 8 g/L, more preferably 3 to 6 g/L of the leveler; and
d. 150 to 250 g/L, more preferably 175 to 225 g/L, more preferably 190 to 210 g/L of the polar solvent.

13. A copper electrolyte consisting essentially of:

a. a water soluble copper salt;

b. a complexant;

c. a leveler;

d. 0 to 300 g/L of a polar solvent;

e. optionally, a pH adjuster; and

f. balance water,

wherein the copper electrolyte has a pH in the range of 8 to 11, preferably 8.2 to 9.5.

14. A copper electrolyte consisting of:

a. a water soluble copper salt;

b. a complexant;

c. a leveler;

d. 0 to 300 g/L of a polar solvent;

e. optionally, a pH adjuster; and

f. balance water,

wherein the copper electrolyte has a pH in the range of 8 to 11, preferably 8.2 to 9.5.

15. A method of depositing a copper film on a conductive substrate, the method comprising the steps of:

a) optionally, pretreating the conductive substrate, wherein the pretreatment step removes surface oxides; and

b) immersing the conductive substrate into a copper electrolyte, wherein the copper electrolyte comprises:

a. a water soluble copper salt;

b. a complexant;

c. a leveler;

d. optionally a polar solvent;

e. optionally, a pH adjuster; and

f. balance water,

wherein the copper electrolyte has a pH in the range of 8 to 11, preferably 8.2 to 9.5, and

c) electrodepositing the copper film on the conductive substrate using the copper electrolyte described herein, wherein the copper film is an ultrathin copper film having a thickness of less than 5 nm, wherein the ultrathin copper film is a continuous copper film that is free of any pinholes or other defects.

16. The method according to claim 15, wherein the pretreatment step comprises contacting the conductive substrate with a pretreatment solution containing a dilute weak acid.

17. The method according to claim 16, wherein the dilute weak acid comprises a solution of citric acid.

18. The method according to any of claims 15 to 17, wherein the ultrathin copper film has a thickness of less 4 nm, preferably less than 2 nm.