CLAIMS

1. A composition useful for removing residue and photoresist from a semiconductor substrate comprising:

from about 5 to about 60% by wt. of water;

from about 10 to about 90% by wt. at least one water-miscible organic solvent selected from pyrrolidones, sulfonyl-containing solvents, acetamides, glycol ethers, polyols, cyclic alcohols, and mixtures thereof;

from about 5 to about 90% by wt. of at least one alkanolamine;

from about 0.05 to about 20% by wt. of at least one polyfunctional organic acid; and

from about 0.1 to about 10% by wt. of at least one phenol-type corrosion inhibitor,

wherein the composition is substantially free of hydroxylamine.

2. The composition of claim 1 comprising from about 10 to about 60% by wt. of said at least one water-miscible organic solvent.

3. The composition of claim 1 comprising from about 10 to about 50% by wt. of said at least one alkanolamine.

4. The composition of claim 1 comprising from about 0.1 to about 5% by wt. of said at least one polyfunctional organic acid.

5. The composition of claim 1 comprising from about 1 to about 7% by wt. of said at least one phenol-type corrosion inhibitor.

6. The composition of claim 1 comprising from about 5 to about 15% by wt. of said water.

7. The composition of claim 1, wherein said water miscible solvent is selected from N-methyl pyrrolidone (NMP), sulfolane, dimethylsulfoxide (DMSO), dimethylacetamide (DMAC), diproylene glycol monomethyl ether (DPGME), diethylene glycol monomethyl ether (DEGME), butyl digycol (BDG), 3-methoxyl methyl butanol (MMB), tripropylene glycol methyl ether, propylene glycol propyl ether, diethylene gycol n-butyl ether,

ethylene glycol, propylene glycol, 1,4-butanediol, glycerol, tetrahydrofurfuryl alcohol and benzyl alcohol, and mixtures thereof.

8. The composition of claim 1, wherein said at least one water-miscible organic solvent is selected from N-methyl pyrrolidone (NMP), dimethylacetamide (DMSO), dimethylacetamide (DMAC), diproylene glycol monomethyl ether (DPGME), ethylene glycol, propylene glycol (PG), and mixures thereof.

9. The composition of claim 1, wherein the at least one alkanolamine is selected from N-methylethanolamine (NMEA), monoethanolamine (MEA), diethanolamine, mono-, di- and triisopropanolamine, 2-(2-aminoethylamino)ethanol, 2-(2-aminoethoxy)ethanol, triethanolamine, N-ethyl ethanolamine, N,N-dimethylethanolamine, N,N-diethyl ethanolamine, N-methyl diethanolamine, N-ethyl diethanolamine, cyclohexylaminediethanol, and mixtures thereof.

10. The composition of claim 1, wherein the alkanolamine comprises N-methylethanolamine.

11. The composition of claim 1, wherein the alkanolamine comprises monoethanolamine.

12. The composition of claim 1, wherein said at least one phenol-type corrosion inhibitor is selected from t-butyl catechol, catechol, 2,3-dihydroxybenzoic acid, gallic acid, resorcinol, and mixtures thereof.

13. The composition of claim 1, wherein the at least one polyfunctional organic acid is selected from citric acid, malonic acid, malic acid, tartaric acid, oxalic acid, phthalic acid, maleic acid, ethylenedinitrilo)tetraacetic acid (EDTA), butylenediaminetetraacetic acid, (1,2-cyclohexylenedinitrilo-)tetraacetic acid (CyDTA), diethylenetriaminepentaacetic acid (DETPA), ethylenediaminetetrapropionic acid, (hydroxyethyl)ethylenediaminetriacetic acid (HEDTA) and mixtures thereof.

14. The composition of claim 1, wherein the at least one polyfunctional organic acid comprises citric acid.

15. The composition of claim 1, wherein the at least one water-miscible organic solvent comprises NMP.

16. The composition of claim 1, wherein the at least one water-miscible organic solvent comprises DMSO.

17. The composition of claim 1 further comprising at least one chelating agent, wherein said at least one chelating agent differs from said at least one corrosion inhibitor and said at least one polyfunctional acid.

18. The composition of claim 17, wherein said at least one chelating agent is present in said composition in an amount from about 0.1 to about 2 wt %.

19. The composition of claim 17, wherein said at least one chelating agent is selected from (ethylenedinitrilo)tetraacetic acid (EDTA), butylenediaminetetraacetic acid, (1,2-cyclohexylenedinitrilo-)tetraacetic acid (CyDTA), diethylenetriaminepentaacetic acid (DETPA), ethylenediaminetetrapropionic acid, (hydroxyethyl)ethylenediaminetriacetic acid (HEDTA), N, N,N', N'-ethylenediaminetetra(methylenephosphonic) acid (EDTMP), triethylenetetraaminehexaacetic acid (TTHA), 1,3-diamino-2-hydroxypropane-N,N,N',N'-tetraacetic acid (DHPTA), isomers or salts thereof, and mixtures thereof.

20. The composition of claim 1 having a pH value from 9 to 13.

21. A method for removing residue or photoresist from a substrate comprising at least one of aluminum-copper alloy, aluminum nitride and tungsten; the method comprising the steps of:

contacting the substrate with a cleaning composition of claim 1; and

rinsing the substrate with water.

22. The method of claim 21 wherein the temperature of the cleaning composition during the contacting step is from about 25° C to about 85° C.

23. The method of claim 21 further comprising, prior to the step of rinsing the substrate with water, a step of rinsing the substrate with an organic solvent.

24. The method of claim 21, wherein the etch rate is less than about 1 Å /min when the temperature of cleaning composition during the contacting step is less than or equal to about 60°C.